Establishing Biomass Green Energy: Conveying the Environmental Benefits and Impacts of Biomass

Summary Report 2

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TABLE OF CONTENTS

1 Introduction

This Subtask supports the efforts of NREL and the Biopower program to convey the benefits of biomass power to environmental interest groups and others involved in establishing standards and criteria for green power products. During the Green-e decision-making process for each state or region, stakeholder groups often request specific information on the environmental impacts of biomass power. This information is used by group members to devise criteria and limitations for biopower generation for inclusion in *certified* green power products. This task is intended to support the collection, organization, verification and presentation of these materials at approximately three or four meetings.

This report is the second of two under the *Establishing Green Energy* subtask. It summarizes biomass-related information presented and gathered at the New York Green-e Advisory Board Meeting in Albany, NY on July 18, 2002 and materials prepared subsequently for the NY Governors Green Power Initiative.

2 New York Green-e Advisory Board Meeting

2.1 Meeting Summary

Antares participated in both the Subcommittee and full advisory committee meetings for the Green-e process in New York. In an earlier report on Outreach to NGO's Antares reported on the discussions and results of the meeting as follows:

Both the biomass subcommittee and the full Advisory Committee were open to discussing a standard that gave the Renewable Energy (RE) technologies and particularly biomass a full and fair hearing on the net benefits that derive from the technology. As a result the Advisory Committee is recommending a standard that is like the New England Standard but extends the biomass standard beyond New England in two important ways:

- Acceptable biomass residues now exclude only materials that contain contaminants that can create combustion emission problems.
- Acceptable conversion technologies now include cofiring biomass at a coal-fired facility with one unique constraint – energy crops must make up 10% of the biomass fuel mix.

Committee members recognized the value of diverting biomass residues from landfills as a means of avoiding greenhouse gas emissions from decomposing biomass. They also recognized that wood treated with organic byproducts such as creosote pose a potential environmental threat when landfilled or stockpiled where over time the organic compound can leach out of the wood. By comparison the combustion of the organic byproducts in a large permitted power generation facility has been tested and will break down the treated wood to simple nonhazardous combustion products. Using the biomass residues as an energy resource for power generation has a net positive environmental benefit.

On the other hand, wood residues treated with preservatives containing halogens and arsenic are very difficult to combust without generating potential hazardous byproducts and these materials are specifically excluded in the Draft NY Standard as follows:

- Wood that has been coated with paints, plastics, or Formica;
- Wood that has been treated for preservation with materials containing halogens, chlorine or halide compounds like CCA-treated materials, or arsenic. (CCA = chromated copper arsenate)

The NY biomass subcommittee and the NY Advisory committee broadened the standard for conversion technologies to include cofiring biomass at fossil fired facilities. This represented a significant change from the stated Green-e policy that cofiring was too controversial to include. Again the committees considered the net benefits and felt that the benefits of directly displacing coal held merit.

Qualifying biomass resources can be cofired with fossil fuels under the following specific conditions:

- The proportion of biomass to other fossil fuels is accounted for on an annual basis;
- Contracts are in place to allow CRS to verify that the biomass was converted into electricity;
- Only the amount of energy generated from the biomass may be counted as renewable energy;
- Title to the non-energy attributes resulting from the biomass generation remain entirely (or at least proportionately) with the biomass electricity or Tradable Renewable Certificates (TRC) marketed as renewable as consistent with NYPSC rules;
- At least 10% of the biomass used is from energy crops; and
- The host generating plant is in compliance with all air permits.

2.2 Information Presented at the Meeting July 18 2002

Two presentations were made at the Advisory Board Meeting for consideration of the Biomass Standard. John Irving of Burlington Electric Department made the first presentation on the overall considerations for what should be included in the biomass resource definition. The definition was developed jointly by BED and Antares to allow relatively clean residue resources to be used while avoiding the resource constituents that might cause environmental concerns. Ed Gray of Antares Group Incorporated made a special presentation on the benefits of cofiring biomass to displace fossil fuels at existing power plants.

2.2.1 Biomass Definitions

One of the major issues for Green-e Standards for biomass has been resource content. On the one hand the simple definition of clean untreated wood has been offered as a means to ensure that there can be no problematic contaminants for combustion. This definition excludes a large portion of the resource with de minimis contaminants that can be efficiently used in modern biomass plants with proper emission controls. It fails because wood that has no chemicals applied after harvest may still contain contaminants if it is grown in contaminated soils. Like most rules it is an oversimplification. However, there are categories of treated wood that contain problematic contaminants at sufficient levels to be cause for concern. While there is evidence that state of the art combustion and emission controls can handle these sources they do represent a greater risk in the event of a combustion upset. The best practical definition combines (1) a requirement for facilities to be in compliance with air permits governing the plants emissions and (2) limitations on the resource for the higher risk sources.

This approach resulted in defining qualified resources as follows:

A) All woody biomass excluding:
- Wood that has been coated with paints, plastics, or Formica;
- Wood that has been treated for preservation with materials containing halogens, chlorine or halide compounds like CCA-treated materials, or arsenic. (CCA = chromated copper arsenate)
- Municipal solid waste

There may be de minimis quantities of qualified wood fuel (<1% of total wood fuel) that can contain the above excluded contaminates.

B) All agricultural crops or waste;
C) All animal and other organic waste;
D) All energy crops; and
E) Landfill gas.

A lengthy discussion about the risks of creosote treated wood occurred both prior to the meeting and at the meeting. The consensus was the active components of creosote were all combustible petroleum derived hydrocarbons, which are converted to heat with the biomass in power generation facilities particularly those permitted to produce power for sale. The additional consideration was that these products in the waste stream could be a greater problem in landfills where the chemicals have a long life and could leach into the soil.

The second area of concern for resources is the harvesting of woodlots in a sustainable manner. The Sierra Club representative recommended that only woodlots certified by the Forest Stewardship Council (FSC) be included as qualifying sources for green power generators. The committee favored language that stated that it supports the development and certification of sustainable woodlot management and that a suitable definition of sustainable forest management should be developed by the biomass subcommittee for future inclusion in the standard. The committee generally felt that the request for an immediate restriction was not supported by data on how it would affect the availability of biomass resources or to practical extent it would improve environmental quality. The Subcommittee agreed to reconvene and consider the merits of FSC certification and other protective measures for assuring sustainable harvesting practices for woodlot biomass resources.

2.2.2 Qualifying Facilities

The debate on qualifying facilities is equally complex. The debate in the Northeast has focused primarily on air emissions. The New England Standard has provided the precedent that the other states including New York have opted to follow. This standard is focused narrowly on NO_x emissions caps, which are particularly under scrutiny in the Northeast. The

approach taken here was to initially set a cap on emissions that 50% of the existing facilities could meet. For landfill gas the initial standard is set at a level that is achievable by most well maintained and properly operated reciprocating engine gensets in >1MW capacity range without add-on NO_x control systems.

Landfill Gas Facilities

The NO_x emissions of landfill gas facilities that contribute power toward a specific Green-e product shall not exceed 3.5 lb./MWH on an annual basis, based on a weighted average of the resource supply mix. Landfills not otherwise required to flare are exempted from the Landfill gas NO_x emissions cap. Standard(s) for subsequent years will be reviewed based on the evolution of state-of-the art control technologies two years before they are to go into effect and adjusted down if appropriate.

All Other Qualifying Biomass Facilities

The average, weighted NOx emissions of all facilities using qualifying biomass other than landfill gas that contribute power toward a specific Green-e product shall not exceed:
(i) 2.9 lb./MWH of NOx emissions in 2002, 2003, 2004, 2005.
Standard(s) for subsequent years are adopted here, but will be reviewed based on the evolution of state-of-the art control technologies two years before they are to go into effect and adjusted if appropriate.
(ii) 2.63 lb./MWH in 2006, 2007, 2008.
(iii) 2.25 lb./MWH in 2009, 2010, 2011.
Emissions rates from landfill gas may not be factored into the weighted average used in calculating emissions rates from qualifying biomass facilities.

2.2.3 Biomass Cofiring Facilities

Solid biomass and landfill gas can be used as fuel substitutes in fossil fired generation power generation systems. The benefit is usually twofold: increased use of renewable energy and simultaneous direct displacement of fossil fuels. The committee readily accepted the landfill gas cofiring provisions. The solid biomass cofiring provisions were discussed at length.

The primary concern for the sale of green power from a cofiring facility is that the committee members and the public expect that benefits of cofiring must accrue solely to the renewable generation. If the benefits in some way cross subsidize fossil power generation then the committee believes the product can no longer be considered a green power resource. These concerns were addressed in several provisions in the proposed cofiring standard and in the Green-e rules for use of its certification and logo:

- To assure that the green power price paid to the marketer of biomass cofiring products the committee agreed the emission benefits of cofiring would be conveyed fully to the buyer and not retained by the host fossil plant. For example the host plant would not be

able to sell sulfur credits generated by cofiring biomass – those convey to the green power purchaser.
- To assure that Green Power was not used to help keep a plant that was not in compliance with its air emissions permits running, a provision for host plant environmental compliance was included.
- To assure that the host plant could not ascribe the environmental benefits of biomass cofiring to its entire operation and use the Green-e label, Green-e only permits the marketer providing the green power product to customers to use the Green-e logo and to claim Green-e certification.

For the committee the environmental and economic benefits of using energy crops in the cofiring mix were sufficiently attractive and important to include a provision for requiring 10% energy crops in the biomass fuel mix. This provision also provides a nascent market for the pioneering farms that are growing energy crops. Further the energy crop requirement also serves to allay some concerns that all biomass would flow to cofiring facilities where the cost of conversion is lower than stand alone biomass facilities.

2.2.4 Final Ruling on Solid Biomass Cofiring

Despite agreement on the net benefits, inclusion of provisions to assure that the benefits of biomass cofiring are delivered to the customer, and the New York Green-e advisory board's approval, Green Mountain and CRS remain skeptical about the reception cofiring would get from the public and environmental constituents. Antares pointed out that several institutional buyers have expressed a strong interest in the purchase of green power from cofiring facilities however there is no simple means of conveying the environmental benefits arguments to a broad base of residential consumers typically served by Green-e. At this time, the CRS board has rejected the inclusion of solid biomass cofiring until the pioneer facilities can demonstrate consumer acceptance and demand for the product.

3 New York State's Green Power Purchase Initiative

3.1 The Executive Order

Governor Pataki's Executive Order 111 makes commits state facilities to purchase energy from renewable energy sources in two phases:
- 10% of annual use by 2005 and
- 20% by 2010

At the Green-e Advisory Committee meeting Sustainable Energy Advantage, LLC presented results of this study of the impact of the executive order on the development renewable power generation resources and the price of the mandated power. The work was performed under contract to NYSERDA. The study also included additional demands for renewable

power from surrounding states for NY generated renewable power. The study projects 1400 GWhr per year of renewable generation by 2010. The predominant new source is projected to be wind accounting for about half the Renewable generation in 2010. Landfill gas is second with about a 300 GWhr supply. Solid fuels biomass and anaerobic generation make up the remaining 400 GWhr of supply.

3.2 Qualifying Biomass Resources and Facilities

Under the executive order the governor appointed a task force to develop the implementation guidelines for qualifying purchases. These Guidelines are as follows:

As defined in Executive Order 111, State Entities shall seek the purchase of energy generated from the following technologies: wind, solar thermal, photovoltaics, sustainably managed biomass, tidal, geothermal, waste methane, and fuel cells. The majority of these technologies are intermittent generators of electric power. It is likely that future clarifications will be issued for power generated by tidal, methane waste, fuel cells and cofiring plants. The Renewable Power Working Group will continue to meet to address the unresolved issues associated with these and other policy issues on an as-needed basis. Key definitions contained in the EO are paraphrased below:

3.2.1 Sustainably Managed Biomass

The term "sustainably managed biomass" shall include all wood resources, with the exception of contaminated waste wood.

3.2.2 Biomass Power Technologies

Clarification of acceptable biomass power technologies and feedstocks will be considered annually or prior to the issuance of each solicitation for power. For the first round of renewable-power solicitations, utility-scale facilities that cofire wood with coal should not be included in the solicitation.

The order and supporting guidelines include biomass broadly with two exceptions. The first is contaminated waste wood. This could be interpreted very broadly excluding most biomass resources from the fuel mix. It remains to be seen how this provision works in practice. By contrast the Green-e Standard recommended by the NY Advisory board is very clear about what contaminated wood sources are excluded.

The second exclusion is cofiring. According to NYSERDA representatives the cofiring exclusion was made for two reasons:

- First cofiring was perceived as economically viable and therefore does not merit the encouragement of a mandated purchase.
- Second, cofiring at coal-fired generating stations would not be well received by the environmental community as a green power resource.

3.3 Green Power implementation

Antares has worked with both the New York Green-e Advisory Board and the Renewable Energy Working Group to clarify the biomass provisions of the order and guidelines. In section 2 above the efforts to address issues about resources and technologies have been described. NYSERDA participated in and hosted the Green-e committee deliberations. These discussion and the standard should help to clarify some of the issues about qualifying biomass resources. In addition, Antares helped working group members who have expressed interest in including the biomass cofiring option to evaluate the benefits and any restrictions that might be necessary. Essentially the same provisions as proposed to green-e have been proposed for the implementation of the executive order. Two factors appear to make the inclusion of cofiring from biomass and energy crops desirable to state agencies:

- First, the biomass resources and especially the energy crops are produced locally and are perceived as having important local economic development benefits
- Second the projected price premium for biomass cofiring is expected to be very reasonable and therefore helps the agencies comply with the EO within their present budget constraints

Several technology and benefits summaries were provided by Antares and are included as appendices to this report. At the last Working Group meeting the desirability of including cofiring was again discussed and was favorable received. The group agreed to review information about the technology and provision and vote at the next meeting on whether to include the technology. Subsequent to that meeting NYSERDA has been involved in an evaluation of a possible statewide RPS. RPS proponents included cofiring in their qualifying facility definition. As a result the Working group leadership appears to be more inclined to recommend inclusion of cofiring for the renewable energy purchases as well.

APPENDIX A Biomass Cofiring and Green Power References

Documents included:

Biomass Cofiring Benefits
Green Power Accounting at Dunkirk Station
Q&As Concerning Green Certification for Biomass
Biomass Power – A Key Component of Green Power Development
Summary of Analysis of Potential Cost and Impact of NY Executive Order No. 111

Biomass Cofiring Benefits

Cofiring is the practice of combusting a base fuel and a supplemental, dissimilar fuel. Biomass can serve as the supplemental fuel for base fuels like coal. Cofired power, as is true for all biopower, is not intermittent - this is a beneficial characteristic. Other important benefits directly related to the cofiring technology are its potential economic and environmental impacts.

Because of a relatively low initial investment in conversion facilities cofiring makes renewable power generation from biomass much less expensive than otherwise possible. While it cannot compete with very low cost fossil generation it will provide a renewable energy option that green power buyers can afford. For this reason cofiring is the most feasible method of conversion above all others.

The potential environmental benefits from cofiring are plentiful. Each Btu of biomass that replaces a Btu of fossil fuel at the plant reduces acid rain emissions in direct proportion to its use. The establishment of a cofiring market will also divert biomass from landfills, further diminishing greenhouse gas production. In addition, biomass captures carbon as it grows, so when it is burned it results in a carbon dioxide gain to the atmosphere of zero. The process is known as carbon close-looped, or carbon neutral, and as a replacement for coal it directly reduces greenhouse gases. Very few renewable resources can do this so directly.

According to the Annual Energy Outlook 2000, U.S. coal utility capacity is 315 GW. If cofiring biomass could be integrated in all qualified U.S. coal facilities at a rate of only 10% (heat energy basis), 31.5 GW of energy, previously produced by coal, could be displaced by clean biomass energy. This would be enough power to provide 23 million households per year with electricity. In addition, a significant reduction in emissions could be obtained. The carbon reductions alone would be the equivalent of removing approximately 22 million cars from the road. The following bullets summarize the reduction potentials:

- SO2 emissions by 1.75 million tons/year
- NOx emissions by 200 thousand tons/year
- Fossil carbon emissions by 45 million tons/year

Consequently, adopting cofiring in coal facilities at a 10% rate will reduce the U.S. annual consumption of coal by 84.5 million tons.

The biomass to be utilized in cofiring operations may come from clean biomass residues from local wood manufacturing facilities, urban wood residue, forestry and logging operations or from farm-grown energy crops. Benefits of this utilization may include the following:

- the farm grown biomass has tremendous benefits for the local agricultural economy (jobs in crop production & processing, new uses for farm land) and for protecting the land (erosion reduction, carbon sequestration, vital habitat for migratory birds)
- by collectively utilizing these low cost biomass residues for cofiring purposes we can improve the production economics
- under 10% cofiring assumptions, total jobs created from biomass cofiring could reach as high 63,000. The total income created and new tax base could reach up to $1.8 billion annually.

In summary, biomass cofiring offers state facilities an economic choice of green power that encourages new, environmentally beneficial uses of agricultural land and wood byproducts. It has

an immediate and direct impact on the acid rain emissions and greenhouse gas production. In addition, cofiring will produce new income and expand the job market.

Green Power Accounting at Dunkirk Station

This document is provided to NYSERDA and SUNY as business sensitive information and may be used for solely for purposes of evaluating the methods for metering green power produced by biomass.

Proposed Contractual Arrangements

The proposed contractual arrangements for producing green power from biomass at Dunkirk call for an independent organization responsible for the biomass facility and biomass operation to utilize NRG's power plant as a conversion system to produce power. This arrangement will allow separation of responsibilities between plant staff and biomass handling/processing operations and provides for separate accounting for biomass power production. Details of these arrangements are still to be negotiated, but green power sales will be the sole responsibility of the independent organization, not the power plant owner. One of the mechanisms being considered is a tolling arrangement with the power plant for the conversion of biomass into electricity. A contract of differences is a well-established method for billing the ultimate power customer for the green power.

Separating Green Power from Coal Power at Dunkirk

Reliable and accurate measurement methodologies have been developed to track "green electron" production at the plant. Accurately accounting for green power production at Dunkirk will be based on a strict measurement and accounting of biomass heat input to the conversion device coupled with real time heat rate measurements to determine the precise amount of electricity produced from biomass resources. It will also be crosschecked by independent measurements and calculations for the coal-fired portion of generation. There will be an agreed upon method for reconciliation of the cross check.

Currently, the project team expects that biomass will contribute approximately 10% of the heat supplied to Unit 1's boilers. Correspondingly, biomass will represent 10% of the energy that will generate the electricity from Unit 1's generator and correspondingly 10% of the units electrical output will be "green."

Monitoring the electric energy contribution of biomass to the plants electricity production in real time requires measurement of fuel composition from biomass, metering for biomass solid fuel flow on a mass basis, and measuring heat rates for Unit 1 power generation. Heat Rate is determined from the independent measurements of coal and biomass energy inputs and measured electricity output all on Unit 1.

Measurement Systems

The plant uses a sophisticated control system that accounts for all of the plant variables associated with producing power at the station. These include the fuel flows, boiler steam conditions, and power output. This data can be used to assess the total amount of heat energy that is being introduced into the boiler and the corresponding power output.

The project team plans to implement a new in line measurement technology to determine the biomass heat input directly. The biomass feed system is designed to accurately meter biomass fuel to the boiler on a mass basis. In line fuel analyzers are now available that will allow the project team to determine the heating value of the biomass being introduced in real time.

Although such and installation will add expense to the project, it will give the project team an independent measurement of the boilers biomass heat input.

The plant also has sophisticated monitoring equipment for measuring the amount of coal (mass flow) that is being injected into the system to maintain the desired steam conditions. The heating value for the coal used at the plant is a known value based on ultimate analyses and will be used to determine the amount of heat energy contributed by coal during cofiring operations. This will be collected on a minute-by-minute basis, aggregated, and used for the determination of coal generated power and settling on conversion services rendered by NRG to the biomass facility operator.

Closing

The project team is confident that by installing accurate biomass metering devices coupled with the plants energy production measurement systems, green power customers can be assured that they are getting the power they paid for. As part of the project team's commitment to green power customers, these accounting methods and necessary data for independent verification will be made available on the group's web-site. Although the extra accounting will add to the expense of providing a green power product at the plant, the project team feels it is necessary to the long-term success of the project.

Q&As Concerning Green Certification for Biomass

The New York Green-e Advisory Board met in July to consider the Green-e Standard for renewable power generation in New York. The Board recommended inclusion of biomass residues (except for specific resources known to have contaminants that might impact air quality in combustion) and sustainably grown energy crops. The board also recommended inclusion of conversion technologies that produce electricity using fossil fuels and biomass resources simultaneously (cofiring).

1. **How will the portion of the electricity produced from biomass be calculated for a cofiring project?** The biomass fuel in a cofiring operation must be weighed and sampled for heat content. This will allow a real time calculation of the total biomass heat input. The amount of biomass electricity produced is calculated by multiplying the ratio of biomass heat input to the total heat input (biomass and fossil fuel) times the total electricity output.

2. **How will sustainable production of biomass energy crops be determined?** The best available method at this time is the certification process offered by Forest Stewardship Council. The board recommended a review of those requirements and application of them to energy crops.

3. **How will biomass cofiring environmental benefits be made a lasting benefit to the local environment?** The installation of biomass facilities at a host power plant for significant cofiring (more than 2%) is a multi million dollar investment requiring several years to payback. In addition, the Board recommended a minimum content of 10% energy crops to assure that the soil conservation; habitat and rural economic benefits of cofiring energy crops are captured. The board also recommended that certification only be granted to biomass power generated at a station that is in full compliance with all of its air permits to assure that the biomass air emission benefits are in addition to current permit standards.

4. **How do the environmental benefits that accrue to biomass cofiring convey to the power purchase?** Title to the non-energy attributes resulting from the biomass generation remain entirely (or at least proportionately) with the biomass electricity or Tradable Renewable Certificates (TRCs) and they will be marketed in a manner consistent with NYPSC rules.

5. **If biomass cofiring is moderately priced green power, how much of it will be available to the New York green power market?** The 10 % energy crop provision for green power from biomass will limit growth of biomass cofiring projects to the ability of projects to establish new acreage in New York. This is a new and innovative method of producing biomass and new acreage and introduction of new acreage will be slow until the market is proven to growers. Energy crops require minimum 3-year establishment periods (for biological reasons) and substantial up-front investments. Like many renewable energy resources a gradual introduction is most likely to occur.

Biomass Power – A Key Component of Green Power Development

New York's Green Power Initiative for Public Buildings should include Biomass Power generated by cofiring in existing power generation boilers for many reasons. The Salix Consortium's BioPower Development project will demonstrate all of the green benefits of this approach.

The Salix Project draws its biomass from two key resources: 500 acres of locally grown willow in Western New York and clean biomass residues from local wood manufacturing facilities.

- the farm grown biomass has tremendous benefits for the local agricultural economy (jobs in crop production & processing, increased local tax base, new uses for farm land) and for protecting the land (erosion reduction, carbon sequestration, vital habitat for migratory birds)
- utilizing biomass residues from local wood manufacturing facilities improves the production economics and has a huge impact on the reduction of green house gases produced in landfills by diverting the residues away from the landfills.

Cofiring biomass at the Dunkirk Steam Station has both important economic benefits and environmental benefits:

- Because of a relatively low initial investment in conversion facilities cofiring makes renewable power generation from biomass much less expensive than otherwise possible. While it cannot compete with very low cost fossil generation it will provide a renewable energy option that green power buyers can afford. For this reason the Consortium selected this method of conversion above all others.
- Each Btu of biomass that replaces a Btu of fossil fuel at the plant reduces acid rain emissions in direct proportion to its use. In addition, it is carbon neutral and as a replacement for coal it directly reduces greenhouse gases. The planned 10 MW of power will add a small but significant supply of green power that may be replicated at other existing faculties.

In summary, inclusion of biomass cofiring in the State's Green Power Initiative offers state facilities an economic choice of green power that encourages new, environmentally beneficial uses of agricultural land and wood byproducts. It has an immediate and direct impact on the acid rain emissions and greenhouse gas production. On the contrary, if it is excluded from the Green Power Pool, seven years of research and development to introduce a new form of energy crop will be lost and farm land in Western New York will revert to either intensive agriculture or idle land.

New York's Biomass Cofiring Potential

Biomass cofiring can significantly reduce New York's dependence on imported energy (i.e. coal brought in from other states) resources, improve local air quality, and mitigate greenhouse gas emissions. In an effort to quantify these benefits, at least two recent studies commissioned by Oak Ridge National Laboratory and the National Renewable Energy Laboratory have scoped the potential for biomass cofiring to penetrate New York's power market. Both reports indicated that between 3.4 and 10.7% of New York's coal-fired generation could be replaced with low-cost woody biomass fuels.

Based on current estimates of New York's utility coal-fired generation, these figures suggest that biomass cofiring could create 132 to 416 MW of new renewable power generation by 2010. Biomass characteristics including a demonstrated ability to reduce both SOx and NOx production in cofiring applications, and CO_2 neutrality also offer a significant potential for emission benefits. Using average

parameters for these benefits and the capacities estimated above, co-firing willow and other wood biomass in New York would have the following impacts on emission reductions:

- SO_2 emissions by 3,000-11,000 tons per year
- NO_X emissions by 1,000-3,000 tons per year
- CO_2 emissions by 412,000-1,300,000 tons per year

As a direct substitute for an existing fossil fuel, biomass fuels have a positive impact on New York's baseline emission profile, and redirect the flow of money for energy purchases from outside to inside the state. On an energy per unit basis, willow biomass is cheaper to produce than natural gas (at current prices). However, willow is a premium solid fuel and can cost twice as much as coal.

BioPower Allocation in New York's Public Sector

While biomass cofiring offers the potential to be a very attractively priced green power resource, the electricity it produces is still more expensive than fossil based resources. Therefore, securing the benefits described above will require consumers to pay a small premium for this power. Like wind and solar energy technologies, biomass cofiring needs the market boost provided by Executive Order #111 to get started.

Excluding biomass cofiring from the technology mix eliminates an important player in the renewable energy market and a vital mechanism for facility managers to hedge the additional expense of using renewable power. By offering managers access to all renewable energy technologies, facilities will be able to strike the balance between achieving the environmental goals of the executive order and managing the additional cost to New York's tax payers.

A market based system would allow the lowest cost technology available in the area to be selected without restriction. If balance among renewable resources is the concern then guidelines for achieving a balanced approach could include:

- Limiting the use of any one renewable energy technology to meet no more than 75% of any facilities renewable energy needs. This would preclude wind or biomass power technologies (including cofiring) from overwhelming the market and shutting out more expensive, but equally attractive alternatives.
- Mandating a balance based on renewable energy technology type. For example 25% wind, 25% solar, 25% BioPower, 25% other qualified technology.

- Requiring a percentage of biomass resources for BioPower to be derived from locally grown biomass feedstocks (10% by 2005 and 20% by 2010).

Regardless of the approach, New York facility managers and the citizens of New York should be offered the opportunity to benefit from all of the renewable energy technologies currently available. In this regard, biomass cofiring should not be singled out for exclusion. Pursuing such a policy would do a disservice to residents and institutions who have (through support of NYSERDA) invested so much in this technology.

Summary of Analysis of Potential Cost and Impact of NY Executive Order No. 111

Performed fall 2001 by Sustainable Energy Advantage, LLC under contract to NYSERDA

Overview:
Executive Order 111 makes commitment for state facilities to purchase energy from defined renewable energy sources, 10% of annual use by 2005 and 20% by 2010

Some key base-case assumptions
Methodology:

- bulk renewables purchased under long-term contracts, in annual procurements
- Calculate renewable generation premiums (RGP) = price premium paid to renewable generators (e.g. REC or conversion transaction price)
    - based difference between real-levelized cost versus long-term forward price curves representing commodity value of production, in upstate NY zones

Supply:

- Developed supply curve representing cost and quantity of various eligible resources
- All: No SBC other than already extended
- Wind:
    - Assumed 5 year PTC extension (through 2006)
    - (included existing only when called upon at levelized cost… under-projects contribution of Fenner, Madison, Western NY Wind)
- Biomass:
    - Co-firing and biomass retrofits of fossil boilers were ignored.
    - "sustainably managed biomass" limited the sources of biomass fuel that are eligible to energy crops and forestry residues
    - existing biomass: Lyons Falls (19 MW) and Chateaugay (19.7 MW) + 25% of generation from 100 MW of other existing biomass plants in the state (or 25 MW total), was available for contracting
    - boiler conversions
    - anaerobic digestion
    - gasification front-end (never called-upon)

Demand:

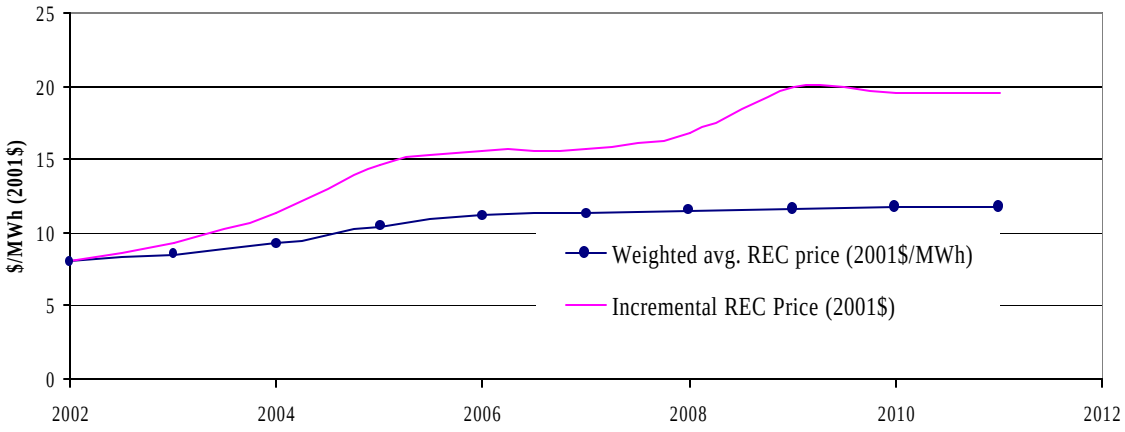
Demands for New York renewables resulting from

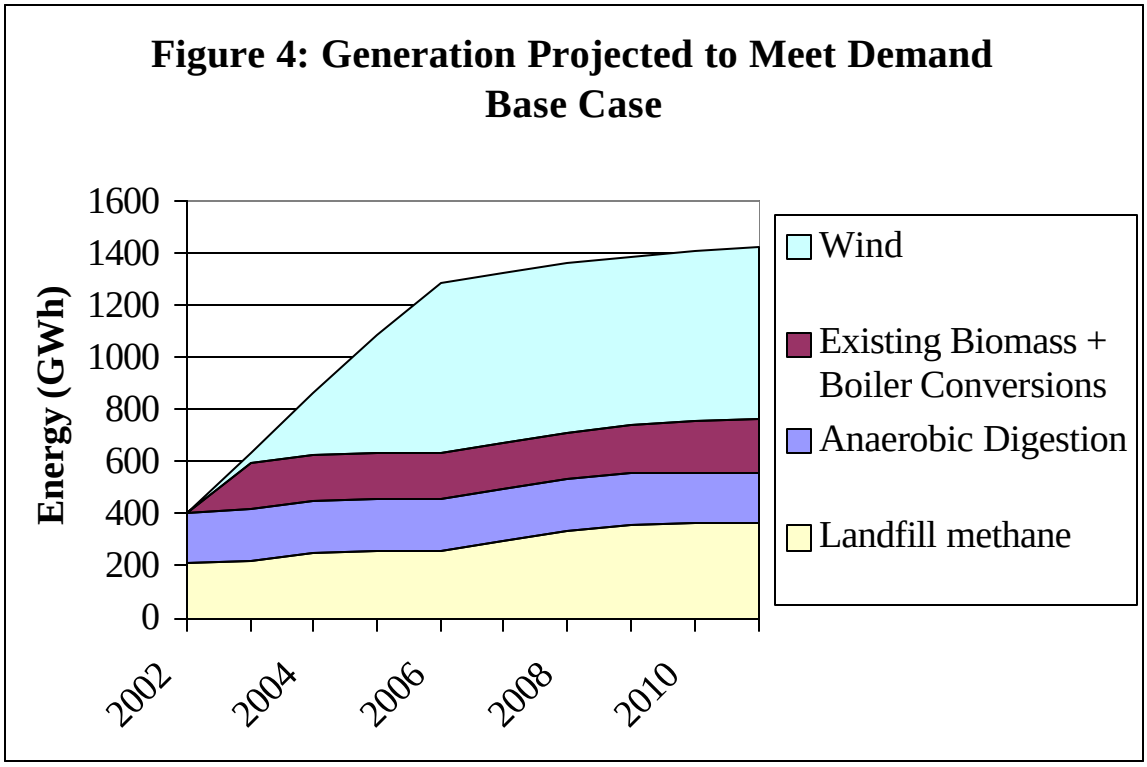
(i) mandated renewables purchases in New York and surrounding states (33% of NJ, CT RPS) and

(ii) voluntary "green" power purchases in New York and surrounding states. (NYSERDA projections of GP demand in NY = 440 GWh/yr in 2005) (plus 10% of NE GP demand from NY resources)

Key Results:
(all in 2001$)

Figure 1:
Real Renewable Generation Premium (REC Price) - Base Case





APPENDIX B Green-e References

Documents included:

Green-e New England Regional Standard (October 18, 1999 Approved)
Green-e Policy on Co-Firing
Green-e Standard: All Regions (May 2, 2001 Revision)
Executive Order 111: "GREEN AND CLEAN" State Buildings and Vehicles Guidelines
Green-e Standard: New York (August 5, 2002 Draft)
Green-e Standard: New York (September 10, 2002 Approved)

Green-e New England Regional Standard
(For Green-e Certified Electricity Products Sold in New England States)

Approved by the Green power Board October 18, 1999

I. Renewable Energy Content

Retail electricity products must contain at least 50% renewable energy based on the product supply mix.

II. Qualifying Fuel Types

Listed below are the only qualifying renewable fuel types which may be used to satisfy the minimum 50% renewable requirement:

A) Geothermal

B) Solar

C) Wind

D) Ocean-based

E) Biomass: For the purposes of Green-e certification, biomass includes conventional wood-based biomass, (including construction debris that does not to contain painted, treated, or pressurized wood), wood waste, agricultural crops or waste, animal and other organic waste and landfill gas. Landfill gas used to co-fire a gas unit (which may include units permitted to burn oil no more than 60 days out of the year) is a qualifying biomass source, whether piped directly to the gas unit or co-mingled with natural gas before reaching the unit. In either case, the landfill gas must be separately metered and must conform to the emissions limits for landfill gas facilities. Municipal solid waste is excluded from the list of qualifying biomass resources.

Any biomass resources used to satisfy the minimum renewable portion of a Green-e product must meet the following emissions criteria. All emissions criteria are based on a weighted average of the emissions from the resource supply mix.

Landfill gas

The NOx emissions of landfill gas facilities that contribute power toward a specific Green-e product shall not exceed 3.5 lb./MWH, based on a weighted average of the resource supply mix. Landfills not otherwise required to flare may be exempted from the Landfill gas NOx emissions cap at a later date.

All Other Qualifying Biomass (as defined above)

The average, weighted NOx emissions of all facilities using qualifying biomass other than landfill gas that contribute power toward a specific Green-e product shall not exceed:

2.9 lb./MWH of NOx emissions in the first, second and third year.
Standard(s) for subsequent years are adopted here, but will be reviewed based on the evolution of state-of-the art control technologies two years before they are to go into effect and adjusted if appropriate.
(ii) 2.63 lb./MWH in the fourth, fifth and sixth years.
(iii) 2.25 lb./MWH in the seventh, eighth and ninth years.
Emissions rates from landfill gas may not be factored into the weighted average used in calculating emissions rates from qualifying biomass facilities.

F) Hydro

Qualifying hydro includes power generated from facilities 30 megawatts or less or facilities re-licensed by FERC after 1986. This definition was adopted for an interim period until such time as the national effort to create standards for identifying low-impact hydropower facilities is complete.

It is expected that low impact hydro criteria developed by the Low-Impact Hydropower Institute will be incorporated into the Green-e standard no later than 18-24 months after the Low-impact Institute presents its program to the Green Power Board, and sooner if practicable. The low-impact criteria cover flows, water quality, fish passage and protection, watershed protection, threatened and endangered species protection, cultural resources protection, recreation, and facilities recommended for removal.

G) Energy Efficiency

Green-e is establishing a process by which energy savings from energy efficiency, AKA "negawatts", can be included as a renewable resource under Green-e certification in Pennsylvania. It is expected that this program will be operational sometime in 2000, at which time the New England Advisory Committee and the Green Power Board may review it for possible inclusion in the New England standard.

III. New Renewables

Effective January 1, 2001, all Green-e products sold in New England must contain at least 5% new renewable resources. The percentage is based on the total product content. This will increase to 10% in the following year. Green-e has a goal of increasing the percentage further to 25% by year five, most likely in 5% increments over the course of the five years. Recognizing that market conditions may change, however, Green-e will only commit to the 5% and 10% standards at this time. Green-e commits to reviewing the standards level at least two years before a change is made, to assess whether and how to meet the year five 25% new content goal. These standards are strict minimum standards.

The definition of new renewable resources is consistent with the New England definition for renewable resources and is consistent with the national standard for new renewable facilities, with the exception that the threshold date for new renewable facilities is one year later than the national standard or January 1, 1998.

IV. Non Renewable Portion of a Green-e Product

Any non-renewable portion of a Green-e product sold in New England must meet or have lower emissions rates per megawatt hour for SO2, NO2, and CO2 than average emissions rates for the New England system power as of the 1997 rates reported in current MA Disclosure statements. These reported rates were 3.9 lbs./MWH for SO2, 1.5lbs./MWH for NOx, and 780 lbs./MWH for CO2.

Green-e products sold in New England may not contain any differentiated nuclear power, differentiated coal power, or differentiated oil power.

V. Verification

Green-e verification will be conducted annually. Disclosure standards will be made consistent with New England State laws whenever possible.

VI. Interaction with Renewable Portfolio Standards

Green-e allows a percentage of a product's renewables content to be satisfied by renewable portfolio standard (RPS) state-mandated renewables up to the percentage RPS requirement as it is applied to a retail product. For example, if the RPS is set at 5% (either company based or product based), only 5% of the Green-e product can be satisfied with renewable power purchased to meet a mandated RPS requirement. Any remaining renewable power needed to fulfill Green-e requirements or product claims can not be satisfied with renewables used to meet any RPS requirement. The Green-e new renewables requirement must be met entirely by renewable generation over and above anything required by state or federal RPS requirements.

VII. Products Which Constitute a Portion of a Retail Offering

As a transitional measure to help promote renewable power in New England, Green-e will certify blocks of 100% new, renewable power available for sale in the minimum amount of 150 kWh per month on an annual basis. This program is approved on a transitional basis only and will be reviewed by the Board in October 2000.

VIII. Items for Inclusion in the Future

The GPB supports the development of a standard for sustainable biomass fuel supply and emissions and a standard for low impact wind. Green-e will consider for adoption such standards as they are developed on a national, regional or state basis.

Green-e Policy on Co-Firing

Issue

This paper outlines how the Green-e policy on co-firing was developed. Detailed are the considerations used for including co-firing, five options for the co-firing policy, and how the final decision was reached by the Green Power Board. The Green-e policy on co-firing was adopted in October 1999.

The Green-e Policy on Co-fired Renewables in Green-e Product Offering:
In all regions, co-firing of landfill methane with natural gas, either piped directly to a natural gas facility or commingled in a natural gas pipeline is permitted if the following conditions are met: 1) the landfill gas is separately metered, and 2) contracts are in place to allow CRS to verify that the landfill gas was converted to electricity, and 3) in New England only, the facility meets the emissions criteria for landfill gas facilities. Only the amount of energy generated from the landfill methane may count towards the 50% renewable criteria. Landfill methane is the only renewable resource that can be co-fired and still count toward the renewable percentage of a Green-e product.

Considerations

CRS considered several issues when deciding whether and how to incorporate co-firing into the Green-e Standard. These issues were framed in the context of the overarching Green-e Program goal to reduce the environmental impacts of electricity generation.

- **Environmental Impacts:**
  The environmental impacts of co-firing facilities, relative to both eligible renewable and conventional sources, were considered. This included tradeoffs among traditional air emissions, global climate gases, toxics, and land/water impacts. It also included a consideration of the direct environmental impacts of a facility as well as the avoided environmental impacts (e.g. global warming impacts if landfill gas is released instead of burned).

- **Renewables Industry Impacts:**
  A key objective of the Green-e Program is to help support the renewables industries. The impact of proposed co-firing decision on the renewables industry was also highlighted.

- **Public Perception:**
  The Green-e Program, along with green power marketing more generally, is at an early stage of development. The public credibility of the market and program are still being built. Green-e already faces a huge educational challenge in explaining to people what Green-e certification means and why they should switch to green power. CRS therefore believed it was imperative to consider the perception of proposed program changes by the general public and the environmental community, and the ease or difficulty in explaining how co-firing fits into the program.

- **Historic Relationships:**
  Many environmental organizations have spent decades trying to close heavily polluting fossil fueled power plants. This debate was sensitive to the impacts the Green-e decision could have on those efforts.

- **Verification:**
  The co-firing option adopted by Green-e had to be easily metered and independently verified by an auditor during the annual Green-e Process Audit. It was important that the auditor be able to verify through contracts, records, or sworn statements that the electricity generated was sold once and only once to a specific retailer.

Co-firing Options

CRS Staff identified a number of co-firing technology alternatives, including:

- MSW co-firing in fossil boilers
- Biomass waste co-firing in MSW facilities
- Biomass waste co-firing with coal, oil or gas
- Landfill gas co-firing with coal, oil, or gas; both direct use by a fossil facility and intermingled in the natural gas pipeline grid
- Solar co-firing (preheat) with coal, oil, or gas
- Geothermal co-firing (preheat) with coal, oil, or gas

Outlined below are five options that were considered for the Green-e policy on Co-firing.

1. **Exclude All Co-Firing**
   This approach would make no changes to current Green-e standards, and therefore would exclude all co-firing as eligible renewable resources in Green-e.

2. **Include co-firing of all of the renewable fuels, except MSW, in natural gas burners only. Exclude all other forms of co-firing; exclude co-mingling landfill gas with natural gas.**
   This approach would allow only a small set of co-firing technologies as eligible Green-e renewable resources. Eligible renewable resources that might be used in this co-firing approach include landfill gas, biomass (presumably gasified), solar, and geothermal. This approach recognizes the environmental advantages of co-firing, but excludes those technologies that raise concerns either due to public perception, historical relationships and/or credibility.

3. **Include co-firing of all of the renewable fuels, except MSW, in natural gas burners only; include commingling landfill gas with natural gas. Exclude all other forms of co-firing.**
   This approach would be the same as the one above except it would include co-mingled natural gas.

4. **Include co-firing of all of the renewable fuels, except MSW, in natural gas burners only; include commingling landfill gas with natural gas; include co-firing with coal and oil under circumstances where emissions are minimized.** Co-firing in a coal or oil facility would only be allowed if the facility meets stringent emissions requirements, for example federal New Source Performance Standards. This approach more broadly recognizes the environmental advantages of co-firing, but would make certain exclusions to address public perception and credibility concerns.

5. **Include all co-firing except with MSW or in MSW incinerators**
This approach would allow all forms of renewable co-firing listed earlier except those involving municipal solid waste. This approach recognizes the important environmental advantages of nearly all form of renewable co-firing.

Decisions Made and Why

In reaching the decision on the national Green-e policy on co-firing, the Green Power Board examined the following cons and pros.

Cons:

- **MSW and MSW Incinerators**
Both the Pennsylvania and New England Advisory Committees have decided to exclude MSW as a renewable fuel under the Green-e Standard. For this reason, the Board did not discuss the merits of including MSW in a co-firing standard.

- **Co-firing Any Renewable Fuel in an Oil and Coal Burners**
Co-firing in oil and coal boilers has a particular public perception problem because electricity coming from any dirty fossil plant does not, on the surface, appear in any way clean or "green." This raises several concerns: 1) there is potential for confusion and misinformation to be spread which could undermine the credibility of Green-e, 2) Green-e has limited educational resources which must be prioritized—efforts to explain a complicated co-firing position will detract from the main message on switching to green power, and 3) adding co-firing to the many confusing energy issues already facing the average consumers in deregulated markets may serve only to add to market inertia.

Pros:

- **Displacing Dirty Fossil Fuels**
Persuasive arguments have been made that co-firing at coal and oil plants directly displaces dirty fuels and therefore has the greatest and clearest environmental benefits. Biomass is also one of the cheapest forms of renewable energy and could potentially make clean products more price competitive. Although some parties have expressed concerns that co-firing could potentially extend the life of a polluting fossil unit, most experts assert that the small percentage of biomass fuel (maximum 10-15% of total fuel used) that could be co-fired and counted toward Green-e is not likely to impact the overall economics of most fossil plants and therefore would not significantly impact the economic decision of whether or not any individual plant will be closed down.

- **Landfill Gas Fired in a Natural Gas Plant**

Landfill gas can be used as a dedicated co-firing fuel, or can be cleaned and injected into the natural gas pipeline grid for use. Landfill gas contains primarily water, methane, CO2, and VOC's (some of which may be hazardous air pollutants). Currently, federal regulations require large landfills to flare the landfill gas. However, an estimated 69% of all landfill gas generated is not flared. Combustion of landfill gas destroys the VOC's that contribute to ground level ozone, and the methane, which is a powerful greenhouse gas (21 times more potent than CO2). Landfill gas combustion produces CO2 and NOx to a much lesser extent. Including landfill gas co-firing into the Green-e Standard might create a market for the large percentage of landfill gas that is not flared; it will also put to good use the landfill gas which is flared but not used for energy generation or is combusted inefficiently (thereby not effectively destroying all potential VOC's or methane). The perception problems surrounding landfill gas are comparatively small because natural gas plants are significantly cleaner than coal or oil fired plants.

One potential problem with landfill gas is that tests have shown that it may release trace amounts of dioxin when burned. Test results show great variance in the amount of dioxin generated (one study of 97 tests worldwide showed a range of 0-1.83 ng/Nm3). It is generally agreed that facilities that operate under good combustion practices (i.e. efficient combustion) will not emit detectable levels of dioxin. Although we do not know what percentage of US plants follow these practices, there is a natural incentive for natural gas plant operators to maximize efficiency because it produces more electricity. Conversely, there is no incentive for landfill operators to flare their gas efficiently.

The "intermingling" with other gas supplies offers a number of possible environmental benefits, and could expand the economic opportunities for the productive use of landfill gas. Nonetheless, the allowance for "intermingling" adds another layer of complexity for the consumer, and could require significant education to offset perception concerns.

- **Solar and Geothermal Pre-heat Co-firing**
  Although these technologies have no air emissions, they may still have the perception and historic problems discussed above depending on the type of plant they are co-fired with.

Based on the pros and cons above, and the considerations for developing a policy that is in accordance with the Green-e Program goals, the Green Power Board voted in October 1999 for option three above. The reasoning for this was that although the Board recognized that co-firing could represent environmental improvement, particularly when it was off-setting the dirtiest fossil fuels, the perception and education issues posed too great of a risk to the credibility of the Green-e Program at this nascent phase in the Program's development and market development. The Board further felt that the Program must prioritize its resources and that efforts to explain or defend a complicated co-firing position would detract from the main message on switching to green power.

The Green-e policy on Co-firing reads as:

In all regions, co-firing of landfill methane with natural gas, either piped directly to a natural gas facility or commingled in a natural gas pipeline is permitted if the following conditions are met: 1) the landfill gas is separately metered, and 2) contracts are in place to allow CRS to verify that the landfill gas was converted to electricity, and 3) in New England only, the

facility meets the emissions criteria for landfill gas facilities. Only the amount of energy generated from the landfill methane may count towards the 50% renewable criteria. Landfill methane is the only renewable resource that can be co-fired and still count toward the renewable percentage of a Green-e product.

Additional Issues Considered by the Board

- **Should co-fired power be able to comprise the entire renewable percentage for any Green-e product? Should co-firing be considered a "New Renewable"?**
  Green-e in PA and CA require that certified products be at least 50% renewable and have a percentage of new renewables starting in 2000. To be counted as a new renewable, the electricity must come from a plant which started generating power after January 1997. Under the current Green-e "new renewable" standard, most co-fired power would not be classified as "new." It has been argued that since the fuel is new, it should be included in the new standard. This presents two distinct questions; Should all biomass fuel be counted as new, e.g. is wood that is being diverted from a particle board factory to a biomass facility on the same level as a newly developed landfill gas resource? Second, if co-fired power is counted as new, should it be allowed to satisfy the entire "new renewable" requirement or only a portion of it?

  The Board made a special provision in the new renewable requirement for new landfill gas to count as new, even if the facility in which it is being burned is not new. This is the only fuel type for which this provision was made. The Board also decided to allow co-fired landfill gas to count toward the new renewable requirement.

- **Should the Green-e co-firing decision be consistent with state disclosure laws?**
  Most states do not have a mechanism for including the renewable percentage of co-fired electricity in required disclosure statements. This could potentially make Green-e disclosure look very different from required state disclosure. This difference could add a layer of complexity to the public education process, which could muddle the Green-e message and make disclosure labels more confusing for the public. It would also require the Green-e audit to be different from any State-required audit, which could be an additional cost to the power marketer. Green-e's policy on disclosure is that the Program will adopt state disclosure requirements for consistency. Therefore, if co-fired landfill gas is not recognized by a state disclosure label, then it effectively can not be claimed by the renewable supplier.

- **Do mechanisms exist to estimate the renewables-fraction of electric output with significant precision?**
  Again, every aspect of the Green-e Standard must be verifiable through our annual audit process. The integrity and credibility of the Green-e program rests on this principle. As in other verification questions, the burden of proof rests with the supplier to ensure that the landfill gas resource was accurately measured, separately metered, converted to electricity, and meets any regional emissions requirements.

Green-e Standard: All Regions

Green-e Renewable Electricity Certification

Revised May 2, 2001

I. Renewable Energy Content:

Retail electricity offerings or " electricity products" that serve 100% of a customer's load must contain at least 50% renewable energy based on the product supply mix. Electricity products sold as block products must contain a minimum of 150 kwh/month of new renewable resources.

II. Qualifying Sources of Renewable Electricity Generation:

1. **Geothermal**
2. **Wind**
3. **Small Hydro:** Includes facilities whose output is equal to or less than 30 megawatts. In New England, hydro facilities relicensed by FERC after 1986 also qualify. Hydropower facilities certified by the Low Impact HydroPower Institute will qualify for Green-e beginning January 1, 2001 in California and January 1, 2002 in all other regions.
4. **Solar Electric**
5. **Biomass:** In California, qualifying sources of biomass include all wood based biomass, agricultural crops or wastes, animal and other organic wastes, landfill gas and municipal solid waste.

   In the Mid Atlantic, approved biomass sources include: landfill gas, digester gas, clean urban waste wood (no painted, treated, or pressurized wood or wood contaminated with plastics or metals) animal and other organic waste, non-herbaceous agricultural waste, mill residues, bioenergy crops.

   In New England, qualifying sources of biomass include: waste wood (including construction debris that does not contain any painted, treated, or pressurized wood), agricultural crops or waste, animal and other organic waste, digester gas, and landfill gas.

   Biomass Emissions: In both New England and the Mid Atlantic, the average weighted NOx emissions from all biomass sources, except landfill gas or digester gas, that contribute to a specific Green-e product sold in New England or the Mid Atlantic shall not exceed:

   2.9 lbs./MWh in 2000, 2001, 2002;
   2.63 lbs./MWh in 2003, 2004, 2005; and
   2.25 lbs./MWh in 2006, 2007, 2008.

   In New England only, the NOx emissions from landfill gas facilities shall not exceed 3.5 lbs./MWh based on a weighted average of the landfill gas mix contributing to a specific Green-e certified product.

6. Cofired Fuels: In all regions, cofiring of landfill methane with natural gas, either piped directly to a natural gas facility or commingled in a natural gas pipeline is permitted if the following conditions are met: 1) the landfill gas is separately metered, and 2) contracts are in place to allow CRS to verify that the landfill gas was converted to electricity, and 3) in New England only, the facility meets the emissions criteria for landfill gas facilities. Only the amount of energy generated from the landfill methane may count towards the 50% renewable criteria. Landfill methane is the only renewable resource that can be cofired and still count toward the renewable percentage of a Green-e product.

7. Negawatts: In Pennsylvania only, negawatts that meet the guidelines of the Negawatts Program as developed by CRS and the Pennsylvania Advisory Committee may be counted toward the renewable portion of a Green-e product.

8. Ocean based Resources: Green-e will consider adopting ocean-based resources and will review these technologies as they mature and as practical application reaches near term.

III. New Renewable Resource Content

All retail products offered in California and Pennsylvania beginning January 1, 2000 must meet the new renewable requirement. In all other states, the new renewable requirement will begin on January 1, after the Green-e Standard is in place, or on January 1, at least six months after the retail electricity market opens, whichever is later. CRS reserves the right to modify the new renewable requirement start date on a state-by-state basis to increase consistency within a region.

The new renewable requirement starts at 5% of total product content in the first year of implementation, increasing to 10% in the following year. Green-e has a goal of increasing the percentage further to 25% in 5% increments each year. This requirement is a strict minimum requirement.

New Renewable Requirement Start Date Table

State	2000	2001	2002	2003	2004
California	5%	10%	10%	15%	TBD*
Connecticut	-	5%	10%	TBD*	TBD*
Delaware	-	-	5%	10%	TBD*
Maine	-	5%	10%	TBD*	TBD*
Maryland	-	-	5%	10%	TBD*
Massachusetts	-	5%	10%	TBD*	TBD*
New Hampshire	-	5%	10%	TBD*	TBD*
New Jersey	-	5%	10%	TBD*	TBD*
Rhode Island	-	5%	10%	TBD*	TBD*
Pennsylvania	5%	10%	10%	15%	TBD*
Vermont	-	-	-	TBD*	TBD*

* Green-e commits to reviewing the requirement level on a state by state basis, at least two years before a change is made, to assess whether and how to meet the 25% new content goal.

An eligible new renewable generation facility must either be: (1) placed in operation (generating electricity) on or after January 1, 1997; (2) repowered on or after January 1, 1997 such that at 80% of the fair market value of the project derives from new generation equipment installed as part of the repowering; (3) a separable improvement to or enhancement of an existing operating facility that was first placed in operation prior to January 1, 1997, such that the proposed incremental generation is contractually available for sale and metered separate from the existing generation at the facility; or (4) a separately metered landfill gas resource that was not being used to generate electricity prior to January 1, 1997. Any enhancement of fuel source that increases generation at an existing facility, without the construction of a new or repowered, separately metered generating unit, is not eligible to participate, with the exception of new landfill gas resources identified in (4) above. An eligible "new renewable" must qualify as an "eligible renewable resource" as described in the Green-e Code-of-Conduct. Hydropower facilities may not contribute toward achievement of the new renewable requirement at this time. In Pennsylvania, “negawatts” may not be used to meet the Green-e new renewable requirement. For power being sold into the New England market, the new renewable requirement applies to facilities not available prior to January 1, 1998.

IV. Emissions Criteria for the Non-Renewable Portion of a Green-e Product

The non-renewable generation component of an eligible product must have an emissions rate per kWh for SO_2, NOx, and CO_2 that does not exceed the average emissions rate for the fossil portion of system power in that region; moreover, in no event may the total fossil emissions rate from an eligible product exceed the average system power emissions rate. In New England, the emission rates for the non-renewable portion of the product may not exceed the 1997 New England system rates.

V. Power Content for Non-Renewable Portion of a Green-e Product

The product may not include any specific purchases of nuclear power in the non-renewable portion of the product other than what is contained in any system power purchased for the product.

VI. Interaction with Renewable Portfolio Standards

Green-e allows a percentage of a product’s renewables content to be satisfied by renewable portfolio standard (RPS) state-mandated renewables up to the percentage RPS requirement as it is applied to a retail product. For example, if the RPS is set at 5% (either company based or product based), only 5% of the Green-e product can be satisfied with renewable power purchased to meet a mandated RPS requirement. Any remaining renewable power needed to fulfill Green-e requirements or product claims can not be satisfied with renewables used to meet any RPS requirement. The Green-e new renewable requirement must be met entirely by renewable generation over and above anything required by state or federal RPS requirements.

VII. Products that Constitute a Portion of a Retail Offering

Green-e will certify blocks of renewable power. The blocks must contain a minimum amount of 150 kWh per month of 100% new renewable resources on an annual basis. Blocks containing more than 150 kwh/month may include existing renewables for any amount above 150 kwh/month. The block products must be part of an all-requirements electricity offering. Secondary use of the Green-e logo for such products will be granted to business customers when they have purchased enough blocks to satisfy 25% of their electricity load on a per meter basis. Any non-renewable portion of the electricity offering must meet the same emissions requirements and power content requirements as all other Green-e blended products (see IV, V above).

VIII. Items for Consideration in the Future

The Green Power Board supports the development of a standard for sustainable biomass fuel supply and emissions and a standard for low impact wind. Green-e will consider for adoption such standards as they are developed on a national, regional or state basis.

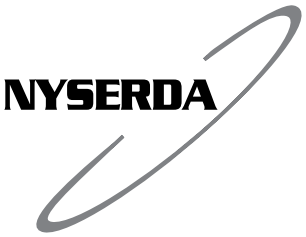
Executive Order No. 111
"Green and Clean"
State Buildings and Vehicles Guidelines

George E. Pataki
Governor

December 2001

New York State
Energy Research and
Development Authority

NYSERDA



The New York State Energy Research and Development Authority (NYSERDA) is a public benefit corporation created in 1975 by the New York State Legislature. NYSERDA's responsibilities include:

- Conducting a multifaceted energy and environmental research and development program to meet New York State's diverse economic needs.
- Administering the **New York Energy $mart**[SM] program, a Statewide public benefit R&D, energy efficiency, and environmental protection program.
- Making energy more affordable for residential and low-income households.
- Helping industries, schools, hospitals, municipalities, not-for-profits, and the residential sector, including low-income residents, implement energy-efficiency measures.
- Providing objective, credible, and useful energy analysis and planning to guide decisions made by major energy stakeholders in the private and public sectors.
- Managing the Western New York Nuclear Service Center at West Valley, including: (1) overseeing the State's interests and share of costs at the West Valley Demonstration Project, a federal/State radioactive waste clean-up effort, and (2) managing wastes and maintaining facilities at the shut-down State-Licensed Disposal Area.
- Coordinating the State's activities on energy emergencies and nuclear regulatory matters, and monitoring low-level radioactive waste generation and management in the State.
- Financing energy-related projects, reducing costs for ratepayers.

NYSERDA administers the **New York Energy $mart**[SM] program, which is designed to support certain public benefit programs during the transition to a more competitive electricity market. Some 1,100 projects in more than 30 programs are funded by a charge on the electricity transmitted and distributed by the State's investor-owned utilities. The **New York Energy $mart**[SM] program provides energy efficiency services, including those directed at the low-income sector, research and development, and environmental protection activities.

NYSERDA derives its basic research revenues from an assessment on the intrastate sales of New York State's investor-owned electric and gas utilities, and voluntary annual contributions by the New York Power Authority and the Long Island Power Authority. Additional research dollars come from limited corporate funds. Some 400 NYSERDA research projects help the State's businesses and municipalities with their energy and environmental problems. Since 1990, NYSERDA has successfully developed and brought into use more than 141 innovative, energy-efficient, and environmentally beneficial products, processes, and services. These contributions to the State's economic growth and environmental protection are made at a cost of about $.70 per New York resident per year.

Federally funded, the Energy Efficiency Services program is working with more than 540 businesses, schools, and municipalities to identify existing technologies and equipment to reduce their energy costs.

For more information, contact the Communications unit, NYSERDA, 17 Columbia Circle, Albany, New York 12203-6399; toll-free 1-866-NYSERDA, locally (518) 862-1090, ext. 3250; or on the web at www.nyserda.org

State of New York
George E. Pataki
Governor

Energy Research and Development Authority
Vincent A. DeIorio, Esq., Chairman
William M. Flynn, President

EXECUTIVE ORDER NO. 111
"GREEN AND CLEAN"
STATE BUILDINGS AND VEHICLES

GUIDELINES

Prepared by the
NEW YORK STATE
ENERGY RESEARCH AND
DEVELOPMENT AUTHORITY
Albany, NY
www.nyserda.org

December 2001

GUIDELINES FOR EXECUTIVE ORDER NO. 111
"GREEN AND CLEAN" STATE BUILDINGS AND VEHICLES

TABLE OF CONTENTS

1. Introduction and Overview

Governor George E. Pataki signed Executive Order No. 111 for "Green and Clean" State Buildings and Vehicles on June 10, 2001 (See Appendix A). This is the most aggressive directive ever issued to address energy use and environmental issues through government procurement standards and design practices. New York State has long been a leader in creating a coordinated long-term energy policy. Executive Order No. 111 places purchasing power and market demand behind the State's coordinated energy plan, which will help to create long-term economic and environmental benefits as well as increase overall market development toward more efficient design and procurement standard practices.

Participants and Benefits

Executive Order No. 111 reaches beyond line agencies and includes all public benefit corporations and public authorities where the heads are appointed by the Governor and for which the Governor has executive authority (hereon referred to as State Entities). A partial list of State Entities included in this order can be found in Appendix B. Significantly, this Order also includes leased space for the first time. The benefits of this Order to the State of New York will include:

- Increased availability of premium efficiency products,
- Increased availability of renewable energy sources,
- Increased knowledge and use of green construction practices,
- Better operations and management practices,
- Reduced summer peak-demand,
- A stronger deregulated market, and
- A less oil dependent economy.

The State will also benefit from reduced energy operating costs, a stronger economy, a reduced long-term tax burden, and an improved environment.

Advisory Council

As part of this Executive Order, an Advisory Council was created consisting of: the President of the New York State Energy Research and Development Authority (NYSERDA); the Director of the Division of the Budget; the Commissioners of the Office of General Services, the Department of Environmental Conservation, the Department of Correctional Services, the Office of Mental Health, and the Department of Transportation; the Chairman of the Public Service Commission; the Chancellor of the State University of New York; the Secretary of State; the Chairman of the New York Power Authority; the Chairman of the Metropolitan Transportation Authority; the Executive Director of the Dormitory Authority; and the President of the Long Island Power Authority. The President of NYSERDA was designated as the chair of the Advisory Council and was responsible for coordinating the development of the Guidelines and the implementation of the Order.

Guideline Development Process

As part of the Guideline development process, six Working Groups were established to address several key issues of the Executive Order. These Working Groups were: the Alternative-Fuel

Vehicle Working Group, the Green Construction Working Group, the Implementation Working Group, the Leased Space Working Group, the Renewable Energy Working Group, and the Reporting and Baseline Working Group. Each Working Group consisted of representatives from several State Agencies and Authorities. The objectives of the Working Groups were to clarify issues, develop operating procedures, and explore strategies that would help achieve full compliance with the requirements of the Executive Order. These Working Groups will continue to meet and address issues associated with this Order.

These guidelines will be updated and re-issued to clarify issues or address questions on an as-needed basis. These Guidelines should in no way impact the life, health, and safety protocols of any State Entity. These Guidelines should not impede the State Entity's ability to deliver its primary services to the State.

Please forward any questions regarding the Executive Order, the Guidelines, appendices, or requests for clarifications to:

NYSERDA
Attn: Executive Order No. 111 Administrator
17 Columbia Circle
Albany, NY 12203-6399

2. Implementation, Budgeting, and Finance

> *"All agencies and departments over which the Governor has Executive authority, and all public benefit corporations and public authorities the heads of which are appointed by the Governor (hereinafter referred to as "State agencies and other affected entities"), shall seek to achieve a reduction in energy consumption by all buildings they own, lease or operate of 35 percent by 2010 relative to 1990 levels. All State agencies and other affected entities shall establish agency-wide reduction targets and associated schedules to reach this goal and shall also be responsible for establishing peak electric demand reduction targets for each state facility by 2005 and 2010."*

Implementing Executive Order No. 111 has significant life-cycle cost savings for the State. However, some of the purchasing and design changes mandated by this Order may involve energy-efficiency investments with higher first cost. Though every avenue for implementation should be explored, agencies are to undertake the implementation of energy efficiency projects within available resources, to the maximum extent practicable and/or as available. The six agencies that facilitate energy-related work and purchasing have compiled lists of their services that will help agencies achieve the goals of the Order. The facilitating agencies are: the Division of the Budget, the New York State Energy Research and Development Authority, New York Power Authority, the Dormitory Authority, the Long Island Power Authority, and the Office of General Services. The program descriptions and links to the Facilitating State Agencies and Authorities can be found at: http://www.nyserda.org/exorder111.html

In addition to securing energy project funding through the State General Fund, State Entities are encouraged to pursue additional funding sources that may be offered through other Federal, State, or private sources. Efforts to secure these alternative funding sources will be particularly important during periods of tight State funding and budget shortfalls. Below is a list of several common funding sources currently available and a brief description of how the funding vehicle works.

Certificates of Participation (COPs) - A form of installment purchase or lease purchase. COPs purchases are not considered debt, and are subject to non-appropriation language. The interest payments are tax-exempt income.

Tax Exempt Financing - A public purpose financing process or program for which the recipient is a state entity or political subdivision engaged in funding transactions for which the interest portion may be excluded from local, state, and federal income tax liability. Such financing structure may include: programs for municipal leasing, tax-exempt and taxable fixed-rate and variable-rate municipal bonds, long-term and short-term financings, bond insurance, letter of credit support, pooled financings, mortgage financing refinancings, and equipment lease-purchase financings.

System Benefits Charge Program - A surcharge on investor-owned utilities. NYSERDA was ordered by the Public Service Commission to be the third-party

administrator of a coordinated program to provide public benefit programs to those parties that pay into the System Benefits Charge.

State EnVest - A NYSERDA program to encourage energy performance contracting in State-owned facilities. It provides a pool of prequalified Energy Service Companies (ESCos) that are under contract to NYSERDA and takes capital construction costs "off-budget." Additional benefits include the ability to use a third-party financial institution under contract to NYSERDA to provide construction funding structured as a tax-exempt municipal lease.

Performance-Based Contracting - A financing vehicle that uses the reduction of utility costs (savings) that result from improvements to pay for the cost of the project. Energy Services Companies (ESCos) typically perform this service.

Federal Energy Funds - The United States Department of Energy periodically issues Requests for Proposals (RFPs) that States may respond to. RFPs cover a variety of topics, and submissions for New York are submitted to the Department of Energy via NYSERDA. Please contact NYSERDA for additional information or if you have suggestions for an innovative program that could be submitted.

DASNY Bonds - The Dormitory Authority of the State of New York (DASNY) is a public-benefit corporation established by the State of New York to finance and construct facilities for both public and private not-for-profit organizations. DASNY offers funding through the issuance of short-term and long-term, fixed and variable rate, taxable and tax-exempt bonds that can be structured to fit the financing needs of the borrowing institution. DASNY is consistently one of the top issuers of tax-exempt financings in the nation.

DASNY Tax-Exempt Equipment Leasing Program (TELP) - DASNY offers its TELP Program to provide its customers with easy and efficient access to the tax-exempt capital leasing market. Under this program, a traditional two-party commercial lease is converted into a tri-party lease agreement. The commercial lender retains the role of lessor, with DASNY participating as the tax-exempt lessee. DASNY then sub-leases the equipment to the client institution. The client repays the commercial lender directly at DASNY's tax-exempt leasing rate. The commercial lender's security runs solely to leased equipment. Since the lender is not required to pay federal, state, or local taxes on the interest portion of the lease payments, the lease financing rate is lowered to reflect the tax savings.

NYPA Financing - The New York Power Authority (NYPA) energy services programs serve State-operated facilities, public schools, and local governments across the State. NYPA finances the audit, design, and installation costs for efficiency upgrades to energy-using equipment and recovers these costs by sharing in the resulting electric bill savings. Program participants retain all the energy savings once NYPA's loan is repaid, usually within ten years or less.

Clean Water/Clean Air Bond Act - Funds may be available from the Clean Water/Clean Air Bond Act for reimbursement of vehicle incremental costs. Incremental costs are calculated by subtracting the cost of the conventionally fueled vehicle from the cost of the comparable alternative-fueled vehicle. Funds may also be available for reimbursement of supporting infrastructure costs. Reimbursement request forms are available on the Office of General Service's Clean Fueled Vehicle Program web site: www.ogs.state.ny.us/cleanfuels/reimbursement.asp

Refer to NYSERDA's web page for additional information and links to these resources, as well as for additional information not listed here at: http://www.nyserda.org/exorder111.html

State Entities are encouraged to perform life-cycle cost analyses on energy-efficiency measures, using free analytical tools and software such as the National Institute of Standards and Technology's Building Life Cycle Cost Program (BLCC). Information about purchasing this software can be found at: http://www.eren.doe.gov/femp/techassist.html

Exemptions

> *"No buildings will be exempt from these goals except pursuant to criteria to be developed by the New York State Energy Research and Development Authority ("NYSERDA"), in consultation with the Division of the Budget ("DOB"), the Office of General Services ("OGS") and the Advisory Council on State Energy Efficiency ("Advisory Council") as established herein."*

Buildings and energy use that have been exempted at this time include buildings of less than 5,000 square feet and those loads defined as process loads by each State Entity. There are some exemptions regarding leased space. These exemptions are identified and clarified in the Leased Space Section of these Guidelines. Additional exemptions will be addressed on an as needed basis as set forth in the provisions of the Executive Order. A partial list of State Entities affected by the Executive Order can be found in Appendix B.

3. Existing Buildings

> *"Effective immediately, State agencies and other affected entities shall implement energy efficiency practices with respect to the operation and maintenance of all buildings that they own, lease or operate. Such practices may include, but shall not be limited to: (1) shutting off office equipment when it is not being used; (2) adjusting the setting of space temperatures; (3) turning off lighting in unoccupied areas; (4) inspecting and re-commissioning or re-tuning heating, air conditioning and ventilation equipment to ensure optimal performance; and (5) cycling and restarting equipment on a staggered basis to shed electricity loads and minimize peak electricity demand usage. State agencies and other affected entities shall strive to meet the ENERGY STAR® building criteria for energy performance and indoor air quality in their existing buildings to the maximum extent practicable."*

Definition of a Building
For the purposes of these Guidelines, a building is defined as a permanently heated structure of more than 5,000 square feet that is non-process oriented. If a State Entity chooses to exempt process buildings or process areas of a building, they must explain in a footnote to the Annual Energy Report what types of buildings and/or energy consumption were exempted in their Annual Energy Report. Each State Entity shall determine its own process-oriented exemptions.

Operations and Management Improvements
Significant improvements in facility operations and efficiency can be gained from relatively low cost improvements in the operations and management (O&M) of facilities. Improvements in facility O&M can effect significant reductions in summer peak demand and in the health and productivity of buildings' occupants. See Appendix C, State Facilities Load Management Opportunities, for suggestions of O&M improvements that can be easily implemented.

Commissioning is strongly recommended to ensure that building sub-systems operate at peak efficiency. Commissioning is a systematic quality-assurance process to verify that all building systems, including mechanical control and electrical systems, are properly integrated and perform according to the owner's requirements. In addition to providing energy savings, proper commissioning can extend equipment life, reduce occupant complaints, and improve building value. For additional information on commissioning and sample commissioning documents, visit: www.nyserda.org/commissioning.html

Summer Peak-Demand Reduction Efforts
Over the next several years, the State's electric utility grid is expected to continue to experience significant system stresses. State Entities are hereby directed to begin designing and implementing a plan to reduce summer peak-demand. This plan should include both long-term demand-reduction efforts and short-term load-curtailment programs. State Entities are responsible for setting their own reduction targets. This goal, and the State Entity's progress toward that target, must be reported on in each Annual Energy Report (See Section 9). During the summer of 2001, State Entities were expected to shed at least 15% of their electric load during periods of critical peak-power demand when called upon to do so. State Entities may be

called on for even greater reductions should there be future emergency situations with regard to electricity power shortages.

The best strategies for obtaining maximum possible peak-demand reductions will include a combination of: operation and management changes, short-duration load-curtailment measures, long-term reductions due to new energy-efficient equipment purchases, and the use of advanced monitoring equipment. See Appendix C, State Facilities Load Management Opportunities, for suggestions of peak-load reduction opportunities**.**

State Entities may be able to significantly lower their annual utility costs and summer demand by utilizing on-site generation, and combined heat and power. New on-site generation should take into account the renewable generation requirements of the Executive Order. The Advisory Council, however, may need to address the possible barriers that could hinder on-site generation by State Entities.

ENERGY STAR® and Green Building Status

State Entities are directed to improve the operating efficiency of their buildings significantly through this Executive Order. In some cases, achieving significant reduction in energy consumption for a particular building may be difficult or cost prohibitive to achieve due to improvements made prior to the base year or an expansion of services the State Entity has experienced. If State Entities are unable to reasonably reach significant reductions in energy consumption, they are directed to explore the possibility of meeting or exceeding the standards set forth by the ENERGY STAR® benchmarking program (see http://www.energystar.gov/ for additional information) or Green Building standards (as appropriate for facility type). State Entities should report their individual facility or building accomplishments on the Annual Energy Report and footnote these successes.

The Green Building Working Group (Green Team) that helped develop the Green Building Section of these Guidelines will continue to work with State Entities to develop approved Green Building standards. In addition, the United States Green Building Council (USGBC) is currently developing guidelines for green building design in existing buildings. As part of the Executive Order's updates, the Green Team will continue to monitor the progress and development of additional USGBC standards and State Entities' recommendations to determine if and how these green building guidelines for existing buildings should be included in future updates of Executive Order No. 111.

4. Green Building Guidelines for New Construction and Substantial Renovation

> *"In the design, construction, operation and maintenance of new buildings, State agencies and other affected entities shall, to the maximum extent practicable, follow guidelines for the construction of "Green Buildings," including guidelines set forth in Tax Law § 19, which created the Green Buildings Tax Credit, and the U.S. Green Buildings Council's LEED™ rating system. Effective immediately, State agencies and other affected entities engaged in the construction of new buildings shall achieve at least a 20 percent improvement in energy efficiency performance relative to levels required by the State's Energy Conservation Construction Code, as amended. For substantial renovation of existing buildings, State agencies and other affected entities shall achieve at least a ten percent improvement. State agencies and other affected entities shall incorporate energy efficient criteria consistent with ENERGY STAR® and any other energy efficiency levels as may be designated by NYSERDA into all specifications developed for new construction and renovation."*

All new and substantially renovated (as determined by the New York State Energy Conservation Construction Code, or its successor) buildings of 20,000 gross square feet or larger being designed, constructed, operated, managed, or maintained by State Entities as of the effective date of this Executive Order shall, to the maximum extent practicable, follow the guidelines for construction of "Green Buildings" that are set forth below. This would include buildings for State Entities whose design and construction is funded privately. Multi-building construction projects where the buildings are of the same basic construction and have an overall combined gross square footage of 20,000 or greater shall also comply. For small buildings less than 20,000 square feet, State Entities are expected to incorporate the significant attributes of green design concepts into these structures to be considered compliant with the intent of the Order.

All new buildings will be designed and constructed in such a way that they meet the criteria for a rating (certified, silver, gold or platinum) from the United States Green Building Council (USGBC) using the LEED™ (Leadership in Energy and Environmental Design) Rating System. See www.usgbc.org to download a copy of LEED™. While compliance with LEED™ criteria is required, a formal rating from the USGBC is voluntary.

In addition, all new buildings affected by the Executive Order must comply with the following criteria from the Green Building Tax Credit as amended (See generally Tax Law Section 19 and 6NYCRR Part 638, and specifically): Indoor Air Quality Testing [Section 638.7(d)(1)]; Indoor Air Quality Management Plan During Construction [Section 638.7(d)(2)], Operations and Maintenance Management Plan [Section 638.7(d)(3)], and Commissioning [Section 638.8].

See http://www.dec.state.ny.us/website/dar/ood/grnbldg.html to download a copy of the Green Building Tax Credit and the latest version of the Green Building Tax Credit Guidelines.

Building designers, owners, and operators should understand that, while low-emitting materials

are not required by these guidelines, their facilities must still comply with the indoor air quality standards of the Green Building Tax Credit.

The GBTC requires that indoor air quality be tested for a minimum of five years. At the end of this minimum testing period, the Indoor Air Quality (IAQ) Manager shall determine whether additional testing is necessary. The IAQ Manager shall document the basis of this determination and include it in the IAQ Testing Report.

The commissioning forms used to complete the required commissioning requirements for buildings complying with Executive Order No. 111 shall be those created by Portland Energy Conservation Incorporated (PECI) or their equivalent. These forms are available at www.peci.org/cx/mcpgs.html.

Building designers are also directed, to the maximum extent practicable, to include real-time or other advanced-monitoring equipment to provide building staff with information to address summer peak-demand issues and proper operation and maintenance of building subsystems. Purchase and installation of advanced-monitoring equipment should take into account Statewide networking efforts.

While not required by the Executive Order, State Entities rehabilitating or renovating existing state-owned buildings or leased space shall make "best faith" efforts, within available resources, to comply with the green building guidelines outlined above, and to maintain the records necessary to document these efforts.

These Guidelines recognize that the Green Building standards set forth above are not a practical application to many facility types, such as transportation or industrial sites, and smaller buildings (20,000 square feet or less). State Entities are directed to work with the Green Team to develop appropriate Green Building standards for their structures that are not addressed by the standards outlined above. Until State Entities have developed approved Green Building standards for these structures, they will be expected to incorporate the significant attributes of the LEED™ and Green Building Tax Credit to be considered compliant with the intent of this Order.

5. Requirements for the Purchase of Renewable Power

> *"State agencies and other affected entities with responsibility for purchasing energy shall increase their purchase of energy generated from the following technologies: wind, solar thermal, photovoltaics, sustainably managed biomass, tidal, geothermal, methane waste and fuel cells. State agencies and other affected entities shall seek to purchase sufficient quantities of energy from these technologies so that 10 percent of the overall annual electric energy requirements of buildings owned, leased or operated by State agencies and other affected entities will be met through these technologies by 2005, increasing to 20 percent by 2010. No agency or affected entity will be exempt from these goals except pursuant to criteria to be developed by NYSERDA, in consultation with DOB, OGS, and the Advisory Council."*

Introduction

The renewable-power procurement component of the Executive Order commits State government to purchase a significant portion of their electric power from clean, renewable power sources. Procurement of renewable power is to be done to the maximum extent practicable and available as the green power market continues to develop. State Entities can fulfill their renewable-power procurement obligations through: complete on-site generation of all renewable power requirements, a mix of on-site generation and open-market electricity procurement to meet the renewable power requirements, or the complete purchase of all renewable-power requirements from the open market. The Executive Order illustrates the commitment of New York State government to lead by example in promoting renewable energy. The commitment of the State to purchase renewable power will help build a sustainable renewable power market during the transition to an open and deregulated electric utility market. This Guideline is designed to minimize the fiscal and administrative impact of the renewable power requirement of the Executive Order as the renewable power market grows and matures. NYSERDA has completed a preliminary fiscal impact analysis of purchasing renewable power. Interested parties should contact NYSERDA for a copy.

As defined in the Executive Order, State Entities shall seek the purchase of energy generated from the following technologies: wind, solar thermal, photovoltaics, sustainably managed biomass, tidal, geothermal, methane waste, and fuel cells. The majority of these technologies are intermittent generators of electric power. It is likely that future clarifications will be issued for power generated by tidal, methane waste, fuel cells and co-firing plants. The Renewable Power Working Group will continue to meet to address the unresolved issues associated with these and other policy issues on an as-needed basis.

Sustainably Managed Biomass

The term "sustainably managed biomass" shall include all wood resources, with the exception of contaminated waste wood.

Biomass Power Technologies

Clarification of acceptable biomass power technologies and feed stocks will be

considered annually or prior to the issuance of each solicitation for power. For the first round of renewable-power solicitations, utility-scale facilities that co-fire wood with coal should not be included in the solicitation.

Policy Recommendations

Procurement of renewable power is a relatively new responsibility for most State Entities. The following issues are designed to define and clarify the Executive Order and its impact on the procurement of electricity for State Entities.

One of the primary goals for the State is to acquire renewable power at the lowest possible cost and minimize transaction costs that State Entities will face to procure renewable power. State Entities should be aware that fixed-price, long-term contracts (or contracts for differences) with some eligible renewable power resources could provide a longer-term price hedge against fluctuating prices of natural-gas-based power generation.

The initial renewable-power solicitation should not differentiate between renewable-power generation facilities that already exist and those yet to be constructed, provided that long-term power purchase agreements (up to 20 years) can be implemented. It is initially estimated that the renewable power will come from an equal mix of existing and new facilities. In addition, the mix of eligible resources should not be specified in the initial renewable-power solicitation, only that the renewable-power generating facility is located in New York State. If the State determines that a specific resource is too dominant in the renewable-power market, State Entities should reserve the right to make final selection of power providers based on a more balanced resource mix.

Wholesale Renewable Power

New York State should determine a suitable central procurement agent responsible for issuing a Request for Proposals (RFP) for long-term power purchase agreements (increments from 5 to 20 years) for the purchase of eligible renewable power on behalf of State Entities. An existing agency or authority could serve as the central procurement agent to contract for power, transmit power in the wholesale power market, and perform accounting and billing services for customers. Use of a central procurement agent will reduce the likelihood that State Entities are competing against each other for renewable power, ensure lower costs, minimize transaction costs, and foster orderly project development. The process to procure renewable power will have to meet Environmental Disclosure requirements as defined by the New York State Department of Public Service.

The central procurement agent for the State must be capable of the following:

- Issuing solicitations for power periodically, at least every two years, to encourage new renewable-power generation companies to participate as the market grows;
- Engaging in long-term contracts (5 to 20 years);
- Ensuring that start dates of providing the renewable power are flexible to support the construction of new facilities;
- Executing Contracts for Differences as a means of contracting with State Entities

to account for any differences between bilateral contract prices and the market value (spot price) of the renewable power;
- Procuring power from the New York Independent System Operator markets or securing the services of a power wholesaler/retailer;
- To ensure the renewable power is being adequately accounted for under the Department of Public Service environmental disclosure requirements.

The length of the contract, start dates, and price for providing power should be proposed by the renewable power-generators. The central procurement agent would then select renewable power providers based on costs and scheduled need for renewable power to meet State Entity and statewide goals.

The central procurement agent may be a single agency or a collaboration among a group of State Entities. Additional discussions are necessary to define the procurement and billing process and responsibilities of all parties. Discussions among NYSERDA, NYPA, OGS, and other interested State Entities will be held to refine the procurement process.

On-site Renewable Power/Distributed Generation

In addition to central procurement, some State Entities may be interested in using on-site power generation from eligible technologies to meet a portion or all of their renewable power requirements. Demonstrating end-use applications of renewable-energy technologies will offer a valuable example to the private sector and lead to market growth.

Future Role of the Renewable Power Working Group

The Renewable Power Working Group will continue to work to resolve issues with the renewable requirements and the Executive Order, and pursue the concept of a central procurement agenct. Once the State's central procurement agent is selected, the Renewable Power Working Group will work to support their efforts and to reduce the transaction costs of the State associated with the procurement of renewable power and address all other critical issues related to renewable power-requirements of the Order on an as-needed basis.

6. Procurement of Energy-Efficient Products

> *"Effective immediately, State agencies and other affected entities shall select ENERGY STAR® energy-efficient products when acquiring new energy-using products or replacing existing equipment. NYSERDA shall adopt guidelines designating target energy efficiency levels for those products for which ENERGY STAR® labels are not yet available."*

As required in the Executive Order, State Entities are to select ENERGY STAR® energy-efficient products, to the maximum extent practicable, when acquiring new energy-using products or replacing existing equipment. For those products that are not ENERGY STAR® rated, State Entities are directed to use the Federal Energy Management Program (FEMP) Purchasing Manual to determine efficiency levels. Copies of these two purchasing manuals, updates, and other materials can be obtained by visiting:

ENERGY STAR® website:	http://www.energystar.gov/
FEMP website:	http://www.eren.doe.gov/femp/

ENERGY STAR® is a voluntary program run by the U.S. Environmental Protection Agency and U.S. Department of Energy to identify and promote energy-efficient products. The program offers product labeling, energy-performance targets, benchmarking tools, and guidance on purchasing practices. The program covers products for most of the building sectors, including residential heating and cooling equipment, major appliances, office equipment, lighting, and consumer electronics. The ENERGY STAR® Purchasing Tool Kit is designed to help facility managers specify and purchase ENERGY STAR® labeled products. More than 11,000 product models in more than 30 product categories bear the ENERGY STAR® label.

For each ENERGY STAR® labeled product, the Tool Kit offers:

- **Product specifications** or the guidelines these products meet to bear the ENERGY STAR® label;
- **Drop-in procurement language** that organizations can incorporate into their purchasing policies;
- **Savings/Life-cycle cost calculators** that show how much energy and money organizations can save by purchasing ENERGY STAR® labeled products; and
- **Product listings (including model number)** of ENERGY STAR® labeled products.

To help purchasers, the ENERGY STAR® Purchasing Tool Kit lists products considered energy efficient but do not bear the ENERGY STAR® label. To qualify, these products must meet strict guidelines for energy efficiency set by FEMP.

FEMP, part of the U.S. Department of Energy, helps federal agencies reduce their costs, increase energy efficiency, use renewable energy, and conserve water. To accomplish this, FEMP offers project financing and technical guidance and assistance, including aggregated procurements and FEMP Product Energy Efficiency Recommendations. These product recommendations identify specifications for equipment in the upper 25% of energy efficiency, including all models that qualify for the ENERGY STAR® product labeling program. FEMP also provides buyer's tips, information on cost effectiveness, and where to locate products. The 40 FEMP Product Energy Efficiency Recommendations, included in the Purchasing Manual, cover residential appliances and equipment, water saving technologies, lighting technologies, commercial appliances and equipment, office technologies, construction products, and commercial and industrial technologies.

Additionally, NYSERDA is establishing minimum-efficiency standards for 18 specific energy-using products and appliances purchased by or for State Entities, as directed by Article 5, Section 5-108 (1) of the New York State Energy Law. These standards will be enacted in 2002. As a part of this effort, NYSERDA is exploring the development of guidelines on more efficient purchases for these same product areas.

State Entities should also be aware that electronic equipment and small appliances often consume electricity even when they are not being used. "Standby power" is used by products such as cell phones, telephones, computers, monitors, computer printers, fax machines, microwave ovens, and other appliances (those with electronic controls and keypads or with clock displays), televisions and video cassette recorders, battery-powered tools, and air conditioners with remote controls. Although the power use is small individually, these products are often referred to as "electricity vampire" products and are becoming numerous. State Entities are encouraged to purchase products using less than 1 watt in the "off" or "standby" mode, which represents a significant savings from typical products that use between 4 and 7 watts in the standby mode.

To meet energy-efficient product procurement requirements, State Entities may need to modify or put in place purchase practices at both the control agency and individual facility levels. Therefore, State Entities are required to provide information on these activities and the associated energy-efficient products as a brief narrative or attachment to their respective Annual Energy Report (See Section 9).

7. Leased Space

Introduction

State Entities, as a normal course of business, commonly procure leased space to fulfill their responsibilities to the citizens of New York State. As part of Executive Order No. 111, all State Entities are directed to incorporate energy-efficient design, operations and management practices, and purchase green and recycled materials for space covered by any lease agreements to which they may be a party. Adherence to these guidelines should not disrupt lease negotiations already in progress at the issuance of this manual.

Due to the unique nature of leases and tenant-owner relationships, complete control over energy systems and building operations may not be possible with leased space. In many instances, leases will be of a short duration, or leases will be for the occupancy of only a small portion of the building. As a result, building owners and other tenants may be unwilling to engage in significant renovations, changes, or disruptions to a facility. In light of this, State Entities are directed to use their best efforts to incorporate what is feasible and practical during lease negotiations and to document these efforts.

To help achieve the goals set forth in this Order, State Entities are encouraged to share with information with the building owner regarding State-run programs that may be able to offset the costs of improvements and encourage building owners to make improvements consistent with the intent of this Order. However, some improvements may have a higher premium cost in leased space than in State-owned facilities. State Entities should consider the life-cycle cost of these improvements and take steps to determine if the energy cost savings associated with the energy investments provides a payback prior to the end of the lease term. State Entities should include reasonable improvements and strive to increase the overall efficiency of space that the State procures annually.

State Entities are directed to seek funding strategies and alternate sources of funding to help finance improvements in leased space that are consistent with those described in the Implementation, Budgeting, and Finance section of these Guidelines. The Leased Space section has been divided into several sub-sections based on common lease arrangements. Each subsection identifies the expectations of State Entities for leased space under their control.

Tenants of leased spaces already procured but undergoing substantial renovations, as defined by the New York State Energy Conservation Construction Code (or its successor), will be required to work with the building owner to achieve reasonable and practical savings and improvements in accordance with the Executive Order. Improvements implemented to comply with this Order should pay for themselves through energy savings prior to the end date of the lease. In addition to these improvements, State Entities are directed to explore operational and maintenance low-cost/no-cost changes that will assist in achieving the mandates set forth in this Executive Order.

All State Entities are directed to explore every opportunity to direct-meter or sub-meter energy consumption of the spaced being leased by the State. If direct-metering or sub-metering is unavailable, State Entities should not attempt to report energy consumption of those spaces as

the data would not be reliable or accurate. The number of spaces and square footage of these spaces should only be footnoted on the Annual Energy Report.

If State Entities do not purchase their own power in their leased space, they are directed to explore the willingness and ability of the building owner to purchase or provide renewable power as required by the Executive Order.

Space that is Not Net-Leased or Individually Metered

Due to the circumstances of these leases, in many cases the tenant will be unable to affect significant changes to the purchase and maintenance of the building's subsystems. However, State Entities are directed to investigate and implement all reasonable opportunities for installing energy and water-efficiency measures, comply with the purchasing requirements of the Order, and incorporate green and recycled materials into the leased space as feasible. Efforts should also be made to make building owners aware of State-run programs that may encourage building-efficiency improvements. This space should not be reported in the Annual Energy Report.

Leases in Multi-Tenant Buildings that are Individually Metered

Leased space that is individually metered and where the State Entity has the ability to implement improvements shall be considered to have the same standing as space owned by the State. All State Entities are hereby directed to begin implementing action plans that work toward the 35 percent reduction in energy consumption from the 1989-1990 base year and comply with the procurement requirements of the Order. If feasible, all State Entities shall incorporate green and recycled materials. If the State Entity is responsible for purchasing its own electricity, it should refer to the Requirements for the Purchase of Renewable Power section of these Guidelines for complying with the renewable-power requirements of the Order.

Space that is Net-Leased

Net-lease arrangements typically, though not always, allow tenants to have significant control over the specification and maintenance of building sub-systems. State Entities with net-leased space shall strive to achieve the energy-efficiency, purchasing, and green and recycled material requirements established in the Executive Order. All State Entities are directed to begin implementing action plans that will work toward these goals. If the State Entity is responsible for purchasing its own electricity, it should refer to the Requirements for the Purchase of Renewable Power section of these Guidelines to comply with the renewable-power requirements of the Order.

Lease/Purchase Arrangements for Existing Buildings Not Being Substantially Renovated

Lease/purchase arrangements (unlike a lease with an option-to-buy arrangement) for existing buildings that will not undergo a substantial renovation, as determined by the New York State Energy Conservation Construction Code (or its successor) prior to occupation, are directed to investigate and implement all reasonable opportunities to install energy and water-efficiency measures, comply with the purchasing requirements of the Order, and incorporate green and recycled materials into the leased space as feasible. If the State Entity is responsible for purchasing its own electricity, it should refer to the Requirements for the Purchase of Renewable

Power section of these Guidelines for complying with the renewable-power requirements of the Order.

Lease/Purchase Arrangements for New Construction and Substantial Renovation
For the purpose of these guidelines, lease/purchase arrangements of new buildings shall be considered new construction projects under the Executive Order. Such projects shall comply with the standards identified in the Green Building Guidelines for New Construction and Substantial Renovation section of these Guidelines. Furthermore, if the State Entity is responsible for purchasing its own electricity, it should refer to the Requirements for the Purchase of Renewable Power section of these Guidelines to comply with the renewable-power requirements of the Order. Tenants involved in substantial renovations, as determined by New York State Energy Conservation Construction Code (or its successor), are directed to make best-faith efforts toward achieving the goals set forth in the Green Building Guidelines for New Construction and Substantial Renovation section of these Guidelines.

8. Alternative-Fuel Vehicles

> *"State agencies and other affected entities shall procure increasing percentages of alternative-fuel vehicles, including hybrid-electric vehicles, as part of their annual vehicle acquisition plans. By 2005, at least 50 percent of new light-duty vehicles acquired by each agency and affected entity shall be alternative-fueled vehicles, and by 2010, 100 percent of all new light-duty vehicles shall be alternative-fueled vehicles with the exception of specialty, police or emergency vehicles as designated by DOB. State agencies and other affected entities that operate medium- and heavy-duty vehicles shall implement strategies to reduce petroleum consumption and emissions by using alternative fuels and improving vehicle fleet fuel efficiency."*

Introduction

The Executive Order sets forth goals that extend well beyond the requirements of the Federal Energy Policy Act (EPAct) of 1992 for "covered fleets." EPAct defines "covered fleets" as agencies who own, operate, lease, or otherwise control 50 or more light duty vehicles (8500 lbs. and under Gross Vehicle Weight Rating - GVWR) that are not under the U.S. Department of Energy's list of excluded vehicles, and 20 of these vehicles are used primarily within urban areas that are centrally fueled or capable of being centrally fueled. The EPAct percentage goal is 75 percent of all light-duty vehicle acquisitions for model year 2001 and thereafter. By contrast, Executive Order No. 111 requirements cover all State Entities, regardless of the number of vehicles in their fleets, or the locations where the vehicles are deployed in the State, with the exception of specialty, police, or emergency vehicles as designated by the Division of the Budget.

Alternative-Fuel Vehicle Acquisitions

The Order mandates State Entities to acquire vehicles that operate on alternative fuels as defined in Appendix D – Glossary of and Terms and Acronyms. Bi-fuel vehicles (e.g., CNG/gasoline; propane/gasoline) and flexible fuel vehicles, (e.g., vehicles fueled by E-85, a blend of 85 percent ethanol and15 percent gasoline) are included; however, State Entities procuring these types of vehicles must demonstrate that a source of the alternative fuel is available. Hybrid-electric vehicles are also included.

By 2005, at least 50 percent of new light-duty vehicles acquired by each State Entity shall be alternative-fuel vehicles. Thereafter, annual alternative-fuel vehicle acquisitions are expected to increase by 10 percent in each succeeding year leading to 2010, when 100 percent of new light-duty vehicles acquired by State Entities must be alternative-fuel vehicles.

Alternative-Fueled Vehicle Acquisition Compliance

The head of each State Entity shall be responsible for ensuring that the State Entity is in compliance with Executive Order No. 111 alternative-fuel vehicle acquisition requirements as set forth in these Guidelines.

Exemptions
State Entities may claim an exemption from Executive Order No. 111 acquisition requirements only if the Division of the Budget designates their vehicles as specialty, police, or emergency vehicles. An exemption will be granted for a period of one year only. State Entities must submit the reasons for claiming exemptions annually.

Procurements Other Than Vehicles
The New York State Clean Fueled Vehicles Council will address other types of procurements, such as fueling/charging equipment, garage or facility modifications, etc. Inquiries regarding such procurements should be directed to the Commissioner, NYS Office of General Services, in his capacity as Chairman of the Clean Fueled Vehicles Council.

Reporting Requirements
State Entities shall include alternative-fuel vehicle acquisition information as part of their Annual Energy Report.

Medium- and Heavy-Duty Vehicles
The head of each State Entity that uses medium- and heavy-duty vehicles, as defined in Appendix D of these Guidelines, shall include, as part of the Annual Energy Report, an explanation of the steps taken to implement strategies to reduce petroleum consumption and emissions through use of alternative fuels and improving vehicle-fleet fuel efficiency.

9. Reporting and Baseline

Introduction

Each State Entity that operates one or more heated State-owned building(s) is required to submit an Annual Energy Report to the New York State Energy Research and Development Authority by December 1st of each year. This report (See Appendix E) shall report on the activity occurring during the previous State fiscal year. The first Annual Energy Report is due December 1, 2002 for the period April 1, 2001 - March 30, 2002. Reports should be sent to:

NYSERDA
Attn: Executive Order No.111 Administrator
17 Columbia Circle
Albany, NY 12203-6399

The purpose of the Annual Energy Report is to demonstrate progress toward achieving the goals set forth in this Order by each State Entity, as well as to help determine the progress of the State as a whole. Executive Order No. 111 makes it the responsibility of each individual State Entity, to the best of its ability, to achieve the goals set forth in the Order.

The 35 percent reduction target of energy consumption in existing buildings is a statewide goal, not necessarily an individual State Entity goal. To achieve this goal, each State Entity will be expected to make significant strides toward reaching this goal if they cannot exceed the 35% reduction target. The measure of success for the statewide 35% reduction target will be based on an Energy Use Index (EUI) metric of total annual Btus consumed by State Entities divided by the total square footage of floor space. The EUI determined in each year will be compared to the EUI measured in the Base Year 1989-1990. It is recognized that certain State Entities are in, or may enter into, a growth/expansion phase. While these State Entities may ultimately consume more Btu/SF as a result of their growth pattern, they are in an excellent position to reduce energy costs on a per capita (or other base unit of measurement) basis. On an individual basis, State Entities are encouraged to develop optional custom metrics to demonstrate that they have successfully made their energy operations as efficient as practical.

Base Year Issues

The fiscal year of 1989-1990 shall be used as the Base Year for measuring energy reduction. For State Entities that do not have energy consumption data for the base year, it will be acceptable to use the earliest available data. If other than the 1989-1990 base year must be used, the Annual Energy Report should include a footnote to identify the base year. In these cases, no prorating of the 35% reduction goal should be expected. The State Entity will still be expected to do the best it can to improve its operations to make it as energy efficient as possible. Appendix F lists historical energy consumption information is listed in Appendix F.

No special consideration will be given for buildings that have been constructed or been taken off line since the base year. The statewide metric of Btu/SF will automatically normalize the increase/decrease in square footage. Provided new construction is designed in an energy efficient manner, the lower Btu/SF in the new buildings will result in reduced overall Btu/SF.

Street lighting, highway lighting, exterior lighting, parking garage lighting, and other ancillary electrical loads should be included in the determination of a State Entity's Btu/SF metric. The electric usage of these end-uses should be distributed over the square footage of the buildings owned by the State Entity.

Reporting Issues

The Annual Energy Report shall be prepared on a State Entity-wide basis only, not on a facility-by-facility basis. One staff member from each State Entity should be designated to submit the Annual Energy Report to NYSERDA. The report form is included in the Guidelines and must be approved by the State Entity's chief executive officer prior to submission. Additional narrative pages may be submitted to detail any unusual situations that occurred during the year or other related metrics on which the State Entity would like to report progress. Any adjustments to the Base Year data or adjustments regarding process-oriented loads are required to be footnoted and to clearly explain the adjustments made.

In an effort to expedite the reporting process, NYSERDA shall explore establishing an Annual Energy Report form on its website for direct data entry by State Entity energy managers. All State Entities will be notified of this when the web page is activated.

The conversion of electricity consumption (kWh) shall be converted to Btus using the source conversion factor of 10,000 Btu/kWh. Additional conversion factors can be found in Appendix G.

Normalizing energy consumption data to account for extremely cold winters or hot summers is not required since harsh weather conditions average out over the long-term. State Entities may include a footnote in their individual Annual Energy Reports if they believe a cold winter or hot summer has adversely affected their energy reduction goals for a particular year.

Where a State Entity provides space to other tenant State Entities, such as when the Office of General Services (OGS) acts as a landlord for other State Entities that occupy its buildings, the provider Entity (building owner) owns the meter and therefore is responsible for the Annual Energy Report for that space. Tenant entities are expected to cooperate with energy-efficiency improvements initiated by the provider Entity. All tenant State Entities shall also comply with the procurement of products standards as set forth by this Executive Order and shall work with the building owner to obtain operations and management savings and peak-demand reductions.

For other leased space where tenant State Entities are responsible for payment of the utility bill and have the authority to initiate energy efficiency measures in their space, the tenant State Entity paying the utility bill is responsible for reporting the facility space. If a State Entity is leasing space that is not individually metered, the State Entity shall not estimate energy usage nor shall they include the square feet of the space in its Annual Energy Report.

State Entities may adjust the base year EUI as conditions warrant. If a State Entity opts to make such an adjustment, a written justification must be included with the Annual Energy Report.

Requirements for renewable energy purchases and alternate-fuel vehicle purchases have target dates in 2005 and 2010. To achieve these goals, State Entities are encouraged to begin increasing the percent of renewable power and alternative-fueled vehicles that they purchase annually in advance of these target dates.

State Entities are required to attach a short narrative to the Annual Energy Report indicating the steps the State Entity has taken to ensure compliance with the procurement requirements set forth by this Order. A final annual report summarizing the statewide energy reduction effort and achievements toward the Order's goals will be compiled by NYSERDA and made available to all State Entities, the Governor's Office, and the Division of the Budget.

Exemptions

Traction loads, process loads, non-building related energy consumption and energy consumption in buildings associated with process loads are not to be included in the Annual Energy Report. Additional exemptions will be considered by the Advisory Council on an as-needed basis.

APPENDIX A

Executive Order No. 111

State of New York

Executive Chamber

No. 111

EXECUTIVE ORDER

DIRECTING STATE AGENCIES TO BE MORE ENERGY EFFICIENT AND ENVIRONMENTALLY AWARE "GREEN AND CLEAN STATE BUILDINGS AND VEHICLES"

WHEREAS, New York is dedicated to the mutually compatible goals of environmental protection and economic growth;

WHEREAS, New York has adopted measures designed to allow energy markets to operate more competitively and has significantly reduced taxes in order to reduce energy costs and encourage continued economic growth;

WHEREAS, the generation and use of energy has a significant impact on the environment, contributing to emissions of sulfur dioxide, nitrogen oxides, greenhouse gases, and other pollutants;

WHEREAS, State government is a major consumer of energy, spending approximately $300 million per year and purchasing approximately 1500 new vehicles annually with a concomitant impact on the environment; and

WHEREAS, it is appropriate that State government assume a leadership role in promoting the efficient use of energy and natural resources in the interest of the long-term protection and enhancement of our environment, our economy, and the health of our children and future generations of New Yorkers.

NOW, THEREFORE, I, GEORGE E. PATAKI, Governor of the State of New York, by virtue of the authority vested in me by the Constitution and Laws of the State of New York, do hereby order as follows:

I New Energy Efficiency Goals.

All agencies and departments over which the Governor has Executive authority, and all public benefit corporations and public authorities the heads of which are appointed by the Governor (hereinafter referred to as "State agencies and other affected entities"), shall seek to achieve a reduction in energy consumption by all buildings they own, lease or operate of 35 percent

by 2010 relative to 1990 levels. All State agencies and other affected entities shall establish agency-wide reduction targets and associated schedules to reach this goal and shall also be responsible for establishing peak electric demand reduction targets for each state facility by 2005 and 2010. No buildings will be exempt from these goals except pursuant to criteria to be developed by the New York State Energy Research and Development Authority ("NYSERDA"), in consultation with the Division of the Budget ("DOB"), the Office of General Services ("OGS") and the Advisory Council on State Energy Efficiency ("Advisory Council") as established herein.

II State Buildings Energy Efficiency Practices.

A. Existing Buildings.

Effective immediately, State agencies and other affected entities shall implement energy efficiency practices with respect to the operation and maintenance of all buildings that they own, lease or operate. Such practices may include, but shall not be limited to: (1) shutting off office equipment when it is not being used; (2) adjusting the setting of space temperatures; (3) turning off lighting in unoccupied areas; (4) inspecting and re-commissioning or re-tuning heating, air conditioning and ventilation equipment to ensure optimal performance; and (5) cycling and restarting equipment on a staggered basis to shed electricity loads and minimize peak electricity demand usage. State agencies and other affected entities shall strive to meet the ENERGY STAR® building criteria for energy performance and indoor environmental quality in their existing buildings to the maximum extent practicable. Within 180 days of the date of this Executive Order, NYSERDA shall develop guidelines to help agencies and other affected entities implement energy efficiency practices in their buildings.

B. New Buildings and Substantial Renovation of Existing Buildings.

In the design, construction, operation and maintenance of new buildings, State agencies and other affected entities shall, to the maximum extent practicable, follow guidelines for the construction of "Green Buildings," including guidelines set forth in Tax Law § 19, which created the Green Buildings Tax Credit, and the U.S. Green Buildings Council's LEED™ rating system. Effective immediately, State agencies and other affected entities engaged in the construction of new buildings shall achieve at least a 20 percent improvement in energy efficiency performance relative to levels required by the State's Energy Conservation Construction Code, as amended. For substantial renovation of existing buildings, State agencies and other affected entities shall achieve at least a ten percent improvement. State agencies and other affected entities shall incorporate energy-efficient criteria consistent with ENERGY STAR® and any other energy efficiency levels as may be designated by NYSERDA into all specifications developed for new construction and renovation.

III Procurement of Energy-Efficient Products.

Effective immediately, State agencies and other affected entities shall select ENERGY STAR® energy-efficient products when acquiring new energy-using products or replacing existing equipment. NYSERDA shall adopt guidelines designating target energy efficiency levels for those products for which ENERGY STAR® labels are not yet available.

IV Purchase of Power from Renewable Sources.

State agencies and other affected entities with responsibility for purchasing energy shall increase their purchase of energy generated from the following technologies: wind, solar thermal, photovoltaics, sustainably managed biomass, tidal, geothermal, methane waste and fuel cells. State agencies and other affected entities shall seek to purchase sufficient quantities of energy from these technologies so that 10 percent of the overall annual electric energy requirements of buildings owned, leased or operated by State agencies and other affected entities will be met through these technologies by 2005, increasing to 20 percent by 2010. No agency or affected entity will be exempt from these goals except pursuant to criteria to be developed by NYSERDA, in consultation with DOB, OGS and the Advisory Council.

V Procurement of Clean Fuel Vehicles.

State agencies and other affected entities shall procure increasing percentages of alternative-fuel vehicles, including hybrid-electric vehicles, as part of their annual vehicle acquisition plans. By 2005, at least 50 percent of new light-duty vehicles acquired by each agency and affected entity shall be alternative-fueled vehicles, and by 2010, 100 percent of all new light-duty vehicles shall be alternative-fueled vehicles, with the exception of specialty, police or emergency vehicles as designated by DOB. State agencies and other affected entities that operate medium- and heavy-duty vehicles shall implement strategies to reduce petroleum consumption and emissions by using alternative fuels and improving vehicle fleet fuel efficiency.

VI Role of NYSERDA and Creation of the Advisory Council on State Energy Efficiency.

NYSERDA shall coordinate implementation of this Executive Order and shall assist each agency and affected entity in the fulfillment of the responsibilities imposed herein in a cost-effective manner. To assist NYSERDA in fulfilling the requirements imposed by this Executive Order, there is hereby established an Advisory Council on State Energy Efficiency consisting of the following members, who shall serve *ex officio*: the President of NYSERDA; the Director of the Division of the Budget; the Commissioners of OGS, the Department of Environmental Conservation, the Department of Correctional Services, the Office of Mental Health and the Department of Transportation; the Chairman of the Public Service Commission; the Chancellor of the State University of New York; the Secretary of State; the Chairman of the New York Power Authority; the Chairman of the Metropolitan Transportation Authority; the Executive Director of the Dormitory Authority; and the President of the Long Island Power Authority. The President of NYSERDA shall serve as the chair of the Advisory Council. The members of the Advisory Council may designate one or more persons to act as their designee(s). The Advisory Council shall meet regularly, but no less than twice a year, for the purpose of advising NYSERDA as to how it can best assist State agencies and other affected entities in achieving the goals of this Executive Order with the greatest degree of cooperative effort and effectiveness. Members of the Advisory Council shall receive no compensation but shall be entitled to reimbursement for any necessary expenses incurred in connection with the performance of their responsibilities.

VII Assistance and Cooperation.

Every agency and department over which the Governor has executive authority, and all public benefit corporations and public authorities the heads of which are appointed by the Governor, shall provide all reasonable assistance and cooperation requested by NYSERDA and the Advisory Council for the purpose of carrying out this order. Such assistance may include the assignment of staff and the provision of support services.

VIII Participation of other governmental entities.

Local governments and school districts that are not subject to the requirements of this Executive Order are encouraged to review their energy efficiency practices and procedures, to institute appropriate operational and maintenance modifications, and to accelerate the implementation of energy efficiency projects. NYSERDA, OGS, the New York Power Authority and the Long Island Power Authority are hereby directed to offer any assistance as may be appropriate to assist local governments and school districts to achieve the goals of this Executive Order, including, but not limited to, assistance with procurement.

IX Repeal of Prior Executive Order.

Executive Order No. 132, promulgated on January 2, 1990, and continued unamended and unmodified, is hereby revoked and superseded by this Executive Order as of the date hereof.

G I V E N under my hand and the Privy Seal of the State in the City of Albany this tenth day of June in the year two thousand one.

George E. Pataki

BY THE GOVERNOR

Secretary to the Governor

APPENDIX B

The following list is a list of the majority of State Entities affected by the Executive Order. As per Executive Order No. 111, State Entities affected by this Order are:

"All agencies and departments over which the Governor has Executive authority, and all public benefit corporations and public authorities the heads of which are appointed by the Governor . . . "

Updates and additions to the following list should be sent to:

NYSERDA
Attn: Executive Order No. 111 Administrator
17 Columbia Circle
Albany, NY 12203

List of Affected State Entities

Albany International Airport
Albany Port District Commission
Baruch College, The City University of New York
Battery Park City Authority
Brooklyn College, The City University of New York
Capital District Transportation Authority
Central New York Regional Transportation Authority
City College, The City University of New York
City University of New York
College of Education, SUNY Brockport
College of Staten Island, The City University of New York
College of Technology, SUNY Canton
College of Technology, SUNY Delhi
College of Technology, SUNY Alfred
Commission on Quality Care for the Mentally Disabled
Cornell University
Division of Alcohol and Beverage Control
Division of Military and Naval Affairs
Empire Expo Center
Empire State College
Empire State Development Corporation
Executive Chamber
Hudson River Valley Greenway
Hudson River-Black River Regulating District
Hunter College, The City University of New York
John Jay College of Criminal Justice, The City University of New York
Lake George Park Commission

Law Reporting Bureau
Legislative Gazette
Lehman College, The City University of New York
Long Island Power Authority
Medgar Evers College, The City University of New York
Mental Hygiene Legal Services
New York City Housing Development Corporation
New York City School Construction Authority
New York City Technical College, The City University of New York
New York Harbor Waterfront Commission
New York State Adirondack Park Agency
New York State Assembly, Minority Leader
New York State Assembly, Majority Leader
New York State Attorney General
New York State Banking Department
New York State Board of Elections
New York State Board of Regents
New York State Bridge Authority
New York State Canal System
New York State Capital Defender Office
New York State College of Ceramics at Alfred University
New York State College of Human Ecology at Cornell University
New York State Commission of Correction
New York State Commission on Judicial Conduct
New York State Commission on Restoration of the Capitol
New York State Consumer Protection Board
New York State Council on Children and Families
New York State Council on the Arts
New York State Crime Victims' Board
New York State Deferred Compensation Plan
New York State Department of Transportation
New York State Department of Taxation and Finance
New York State Department of State
New York State Ethics Commission
New York State Athletic Commission
New York State Department of Agriculture and Markets
New York State Department of Environmental Conservation
New York State Department of Motor Vehicles
New York State Department of Health
New York State Department of Civil Service
New York State Department of Correctional Services
New York State Department of Labor
New York State Development Authority of the North Country
New York State Developmental Disabilities Planning Council
New York State Division for Women
New York State Division of Veterans' Affairs

New York State Division of Tax Appeals Tribunal
New York State Division of Criminal Justice Services
New York State Division of Parole
New York State Division of the Budget
New York State Division of State Police
New York State Division of the Lottery
New York State Division of Probation & Correctional Alternatives
New York State Division of Human Rights
New York State Division of Housing & Community Renewal
New York State Dormitory Authority
New York State Education Department
New York State Emergency Management Office
New York State Environmental Facilities Corporation
New York State Financial Control Board
New York State Freshwater Wetlands Appeals Board
New York State Governor's Office of Regulatory Reform
New York State Governor's Traffic Safety Committee
New York State Harlem Community Development Corporation
New York State Higher Education Services Corporation
New York State Housing Trust Fund Corporation
New York State Insurance Department
New York State Insurance Fund
New York State Liquor Authority
New York State Metropolitan Transportation Authority
New York State Mortgage Agency
New York State Mortgage Agency & Housing Finance
New York State Office of Mental Health
New York State Office of Advocate for Persons with Disabilities
New York State Office of Temporary and Disability Assistance
New York State Office of Parks, Recreation and Historic Preservation
New York State Office of the State Comptroller
New York State Office of the Lieutenant Governor
New York State Office of Children and Family Services
New York State Office of Mental Retardation and Development Disabilities
New York State Office of Alcoholism and Substance Abuse Services
New York State Office of the Inspector General
New York State Office of General Services
New York State Office of Court Administration
New York State Office of Real Property Services
New York State Office of Aging
New York State Office of Prevention of Domestic Violence
New York State Office of the Welfare Inspector General
New York State Power Authority
New York State Public Employee Relations Board
New York State Public Service Commission
New York State Racing and Wagering Board

New York State Roosevelt Island Operating Corporation
New York State Science, Technology and Academic Research
New York State Senate, Minority Leader
New York State Senate, Majority Leader
New York State Temporary State Commission of Investigation
New York State Thruway Authority
New York State Workers' Compensation Board
New York Convention Center Operating Corporation, Jacob Javits Convention Center
Niagara Frontier Transportation Authority
Ogdensburg Bridge and Port Authority
Olympic Regional Development Authority
Peace Bridge Authority
Pennsylvania Station Redevelopment Corporation
Port Authority of New York and New Jersey
Port Of Oswego Authority
Public Employment Relations Board
Queens College, The City University of New York
Rochester Genesee Regional Transportation Authority
New York State Department of Correctional Services
SUNY Administration
SUNY at Buffalo
SUNY Cobleskill
SUNY Construction Fund
SUNY Cortland
SUNY Downstate Medical Center
SUNY Environmental Science/Forestry
SUNY Farmingdale - College of Technology
SUNY Fredonia - College of Education
SUNY Geneseo
SUNY Maritime - Maritime College
SUNY Morrisville - College of Technology
SUNY New Paltz - College of Education
SUNY Old Westbury
SUNY Oneonta
SUNY Optometry - Optometry College
SUNY Oswego - College of Education
SUNY Plattsburgh
SUNY Potsdam - Potsdam College of Education
SUNY Purchase - College of Education
SUNY Stony Brook - University Center
SUNY University at Buffalo
SUNY Upstate - Medical Center
SUNY Utica/Rome - Institute of Technology
Supreme Court Appellate Division - Third Department
Temporary State Commission on Lobbying
The Egg

The Graduate Center, The City University of New York
The Port Authority of New York and New Jersey, John F. Kennedy International Airport
The Port Authority of New York and New Jersey, LaGuardia Airport
Thousand Island Bridge Authority
Tug Hill Commission
University Center, SUNY Binghamton
University Center SUNY Albany
Welfare Research, Inc.
York College, The City University of New York

APPENDIX C

State Facilities Load Management Opportunities

I. Overview

New York State government facilities comprise a significant number of buildings across the State. These facilities could be more energy-efficient and demand responsive through retrofitting cost effective, off-the-shelf technologies, and implementing low-cost or no-cost operational and management improvements. As a general rule, all employees should be expected to conserve energy by being energy conscious throughout the year. For example, employees should responsible for turning off unnecessary lights and closing doors to reduce either the heating or cooling load, etc., throughout the year.

To further reduce load each facility should develop a long-term and short-term program as described below:

Long-Term Load Reduction Program. This program identifies and implements cost-effective, operational and capital projects to help agencies reduce energy costs. State Entities are responsible for setting their own reduction targets. State Entities should report this target, and their progress toward achieving this target, in each Annual Energy Report.

Short-Term Peak-Load Reduction (STPLR) Program. This program identifies immediate action to be taken at all facilities to reduce electric load within 60 minutes (or less) after receiving notification of such an order via the State Emergency Management Office's (SEMO) automated telecommunications system. Staff of the Department of Public Service (DPS) routinely monitors system load changes and forecasts. When electric system peaks are expected, an electric system alert will be provided (either a day ahead or as early as possible on a projected peak day) to inform all affected facilities that a peak load reduction order may be issued imminently. DPS staff, in consultation with the Governor's Office will decide when an order is to be issued. After receiving an STPLR implementation order, each State Entity is expected to confirm that all facilities under their jurisdiction have received the order and that STPLR procedures for each facility are implemented.

Short-Term Peak-Load Reduction Procedures. Each State Entity is responsible for developing STPLR procedures for each facility. Facility managers and operators are expected to develop written procedures that provide a list of actions to be taken when a STPLR order is received. Sufficient resources should be assigned to ensure that the load reduction is accomplished within 60 minutes or less. State Entities are responsible for setting their own short-term peak-load reduction targets and reporting that target in each Annual Energy Report. Data submitted for the Annual Energy Report shall include, as a footnote, the date and time when a STPLR order was received, the percentage of target reduction achieved within 60 minutes of the order, and the time to achieve the load reduction target(s). This program applies to peak electric service periods only and is to include any action or activity that can reduce load by turning a switch, pushing a button, opening a breaker, etc. This program does not include the activation of any emergency electric generator. Such operation could result in a violation of DEC emission

limits.

This program should not be confused with the Emergency Demand Response Program implemented during peak periods by the New York Independent System Operator (NYISO) or your local utility. That program addresses load curtailment either through load-shedding or on-site generation during major emergency situations as determined by the NYISO.

Additional guidance describing the action(s) to be considered in either the long- or short-term program is provided below.

II. Advanced Metering. Each facility shall strive to install demand or interval metering which will enable it to measure demand as well as energy consumed starting May 1, 2002.

III. Long-Term Load Reduction Program. The following items are typical of actions to be taken to reduce electric load on a long-term basis. Although implementation of the items on this list will help reduce peak loads, they are not considered reasonable short-term peak load reduction actions because they generally require a long time to complete and therefore would be unresponsive to a 60 minute order.

A) Fan System Optimization. Train operators to better manage and maintain energy systems and equipment. Suggested tasks include:

- Verify dampers are functioning properly
- Verify that fans are being properly controlled according to occupancy schedules
- Verify the number of fans and individual fan running time necessary for building operation at 72 and 78 degrees (this may decrease as thermostats are raised)
- Investigate the application of dual-speed or variable speed drives, particularly on oversized and large fan motors
- Install premium efficiency motors
- Replace/clean filters, as appropriate
- Verify and maintain outside air ventilation rates at minimum levels
- Maximize the use of “Free cooling” and economizer cycles

B) Piping

- Keep all steam traps in good working condition
- Keep all vent and drain valves tight and in good repair to eliminate unnecessary heat losses
- Inspect pipe insulation and replace as needed
- Consider the benefit of insulation upgrades

C) Pump System Optimization

Repair pump impellers and shaft seals to maintain pump efficiency. This will ensure that

fluid systems are able to maintain required flow rates without excessive energy consumption. If connected to an EMS, verify that pumps are being properly controlled according to its urgency and function. Verify the number of pumps and the individual run-time needed for building operation (this may decrease as thermostats are raised).

- Investigate the application of dual-speed or variable speed drives, particularly on oversized and large pump motors
- Install premium efficiency motors
- Check system for economizer operation.

D) Chiller System Optimization

- Where practical, replace electric centrifugal chillers with absorption chillers or gas-fired chillers
- Sequence chiller operation to achieve the most efficient (least cost) loading conditions of chiller equipment. Use non-electric cooling as base load cooling and least efficient chiller during peak cooling periods
- Increase chilled water supply temperature for electric centrifugal chillers
- Clean condenser coils
- Ensure controls provide setback for unoccupied hours
- Check refrigerant charge
- Check system for economizer operation
- Investigate the application of dual-speed or variable speed drives on cooling tower fan motors with single speed, particularly on oversized and large pump motors
- Turn off or minimize reheats

E) Fired-Pressure Vessel Operation

- Measure combustion efficiency and optimize windbox damper settings, fan speeds and fuel feed rates to obtain the nameplate rating combustion efficiency
- Consider replacement of older, inefficient boiler models
- Verify soot-blowing schedules to ensure that tube and economizer cleaning is optimized
- Maintain water chemistry (if applicable) to reduce scaling on internal surfaces of boilers, heat exchangers, etc. (Scaling retards heat transfer and increases losses.)
- Consider options to pre-heat combustion air by adding fan ducting to take heat from the highest parts of the building
- Consider long-term actions to reduce or preferably eliminate the use of desuperheaters

F) Condensers and Un-Fired Pressure Vessel Operation

- Maintain water chemistry (if applicable) to reduce scaling on internal surfaces of boilers, heat exchangers, etc. (Scaling retards heat transfer and increases losses.)
- Consider options to pre-heat combustion air by adding fan ducting to take heat from the highest parts of the building
- Consider long-term actions to reduce or preferably eliminate the use of desuperheaters
- Periodically determine the efficiency of the heat exchanger and evaluate the need for tube cleaning at least annually consistent with load factors

G) Control System Optimization

- Set space heating/cooling levels to higher ends of the comfort range
- Install an emergency management system to de-energize discretionary or non-vital loads
- Upgrade existing emergency management system to permit automatic load shedding control strategies
- Calibrate instruments periodically to ensure that instrument drift does not contribute to inefficient operation. Either replace old instruments or increase instrument maintenance schedules in proportion to measured drift rates
- Evaluate and set control points (pump and fan start and stop set points) for optimal energy savings
- Check occupancy schedules against EMS set point schedules
- Investigate the benefit of additional control points for potential energy savings
- Check all control points for proper operation
- Assess opportunities for use of lighting control such as occupancy (motion or noise) sensors
- Check control strategies to ensure that multiple systems are not operating unnecessarily
- Install controls for demand-based ventilation.

H) Other Systems

- Survey opportunity for lighting efficiency improvements, (i.e. retrofit to T-8 lamps with electronic ballasts, reflectorized fixtures with less lamps, appropriate switching and lighting controls, daylighting, phase out incandescent lights, and shall seek to achieve a lighting power density of less than one watt per square foot)
- Analyze potential for natural gas–fired continuous service generator peak shaving. For certain facilities, consider recapture of thermal load with water jacket (or suitable heat exchanger) for domestic hot water use

- Analyze the potential of adding co-generation equipment to all processes where reclaimable heat exists, particularly heat processes using absorption chillers
- Reduce or eliminate cooling in unoccupied spaces
- Replace existing window air conditioners with ENERGY STAR® compliant equipment
- Replace computer monitors with ENERGY STAR® compliant equipment
- Install more efficient compressors on split system air conditioning units
- Where feasible, remove window air conditioners and connect building to central chilled water loop
- During the heating months and when experiencing unoccupied hours, space temp should reduced and unnecessary fans off

Short-Term Peak Load Reduction Program

This program consists of reducing all electric loads to "emergency levels" in response to an existing or imminent electric power shortage during summer months only. Revised procedures for achieving short-term peak-load reduction goals should be developed and distributed to responsible personnel by May 1, 2002. During the summer of 2001, State entities were expected to shed at least 15 percent of their electric load during periods of critical peak power demand. Procedures are to be implemented within 60 minutes of notification from the Chairman of the Department of Public Service via SEMO. The following items are typical of actions to be taken to reduce electric load in response to an order to implement the short-term peak-load reduction program. Items on this list generally do not require elaborate planning and preparation. All items should be accomplished within 60 minutes after receiving the order. This program does not include starting emergency generators.

- Turn off appliances (e.g., coffee machines, refrigerators, etc.)
- Turn off escalators
- Reduce lighting to minimal levels
- Set space cooling temperatures to 78 degrees
- Eliminate space cooling in unoccupied rooms
- Turn off all idle equipment such as printers, copiers, personal computers, monitors, etc.
- Verify that the energy management "sleep" features are enabled on computer equipment, so they automatically power down when in intermittent use.
- Turn off all display and decorative lights
- Turn off all lights in unoccupied rooms
- Ensure that all vestibule and exterior doors are tightly closed
- Remove all items (plants, books, furnishings, etc.) from heating/cooling vent grills
- Close blinds and window coverings
- Increase chill water supply temperature
- Shut off redundant fans and pumps or switch line-ups to allow the use of the most efficient equipment
- Survey capability of standby generation equipment to produce power when

ordered by either the NYISO or the Governor's office
- Assess other opportunities for load shifting or load shedding. For example: utilize evenings and back-shifts to do laundry, clean or defrost refrigerators, etc.
- Report load reduction achieved and time to achieve to the appropriate State agency

Many of the above practices, if made part of an agency's routine for workplace O&M, can be utilized on an ongoing basis to achieve overall energy savings.

Additional Resources
The following list is a list of additional resources to help State Entities reduce their electrical peak-demand:

- IEEE 739-1995 (R2000) - *IEE Recommended Practice for Energy Management in Industrial and Commercial Facilities*
- NEMA MG10-1994 (R1999) - *Energy Management Guide for Selection and Use of Polyphase Motors*
- NEMA TP-1 - *Guide for Determining Energy Efficiency for Distribution Transformers*
- ANSI/ASHRAE/IESNA Standard 90.102002 - *Energy Standard for Building except Low-Rise Residential Buildings*
- Federal Energy Management Program (FEMP) - *Building Commissioning Guide* www.eren.doe.gov/femp/techassist/bldgcomgd.html

State Entities interested in receiving a copy of any of the above mentioned documents should contact NYSERDA.

APPENDIX D

Glossary of Terms and Acronyms

"Alternative-fuel vehicles" shall mean vehicles that operate on fuels other than gasoline. This includes dedicated and dual-fuel technologies (including flexible-fuel vehicles), and hybrid-electric vehicles.

"Alternative fuels" shall mean 100% methanol, denatured ethanol, and other alcohols; mixtures containing 85 percent or more by volume of methanol, denatured ethanol, or other alcohols with gasoline or other fuels; natural gas; liquefied petroleum gas (propane); hydrogen; coal-derived liquid fuels; fuels (other than alcohol) derived from biological materials such as pure biodiesel fuel; Pure Fuel Corporation "P-series" blends of 60 percent or more non-petroleum components; electricity (including electricity from solar energy).

"Annual Energy Report" shall mean the one page report (See Appendix E) and any footnotes or attachments submitted to NYSERDA by December 1st of every year affected by the Executive Order. This report will detail the progress towards the goals set forth in this Order and provide the opportunity to highlight successes of the State Entity.

"B20" shall mean a mixture of 20 percent biodiesel and 80 percent standard diesel fuel by volume. Fleets may use biodiesel fuel in blends of B20 or higher to meet up to 50 percent of their annual compliance requirements in vehicles with a gross vehicle rating of greater than 8,500 lbs.

"Bi-fuel vehicles" shall mean vehicles that have two fuel systems, one with an alternative fuel, and one with a conventional fuel, and which may operate on one fuel at a time, or, in some medium- and heavy-duty systems, on a combination of the alternative and conventional fuels.

"Biodiesel fuel" shall mean a nontoxic, biodegradable replacement for petroleum diesel, made from vegetable oil, recycled cooking oil, and tallow. The Btu content of biodiesel is similar to that of petroleum diesel, but is cleaner-burning. Neat biodiesel (B100 or 100% biodiesel) is recognized as an alternative fuel for meeting the mandated programs of the Clean Air Act Amendments and EPAct for credit toward a covered vehicle's annual EPAct requirement for AFV use. Covered fleets that use B100 or a blend of biodiesel (e.g., B20 [20% biodiesel/80% diesel] or higher blends) in medium- and heavy-duty vehicles may earn credits toward their annual AFV acquisition requirements. Each 450 gallons of 100% biodiesel or 2200 gallons of mix will equal one AFV credit, but credits obtained in this manner may not be carried forward from the year in which they are earned, and only 50 percent of the needed credits can be earned with use of biodiesel.

"Commissioning" shall mean a systematic quality-assurance process to verify that all building systems, including mechanical control and electrical systems, are properly integrated and perform according to the owner's requirements.

"Dedicated vehicles" shall mean vehicles that operate solely on an alternative fuel.

"Dual-fuel vehicles" shall mean (1) an automobile that meets the criteria for a dual-fuel automobile as that term is defined in section 513(h)(1)(C) of the Motor Vehicle Information and Cost Savings Act, 49 U.S.C. 32901 (a) (8); or (2) a motor vehicle, other than an automobile, that is capable of operating on alternative fuel or on gasoline or diesel fuel; or (3) a flexible-fuel vehicle.

"Electric vehicles" shall mean vehicles primarily powered by an electric motor that draws current from rechargeable batteries, fuel cells, photovoltaic arrays, or other sources of electric current and that may include hybrid-electric vehicles.

"Emergency vehicles" as defined in New York State Vehicle and Traffic Law, §101, shall mean every ambulance, police vehicle or bicycle, correction vehicle, fire vehicle, civil defense emergency vehicle, emergency ambulance service vehicle, blood delivery vehicle, environmental emergency response vehicle, sanitation patrol vehicle, hazardous materials emergency vehicle, and ordinance disposal vehicle of the armed forces of the United States.

"EPAct" shall mean the federal Energy Policy Act of 1992.

"FEMP" shall mean the Federal Energy Management Program. FEMP's goal is to reduce the cost of operating the Federal Government advancing energy efficiency and water conservation, promoting the use of distributed and renewable energy, and improving utility management decisions at federal sites.

"Flexible-fuel vehicles" shall mean any motor vehicle engineered and designed to be operated on an alternative fuel, a petroleum fuel, or on a broad mixture of the two.

"Heavy-duty vehicles" shall mean vehicles having a gross vehicle weight rating (GVWR) of over 14,000 lbs.

"Hybrid electric vehicles" shall mean vehicles primarily powered by an electric motor that draws current from rechargeable storage batteries, fuel cells, or other sources of electric current and also relies on a non-electric source of power.

LEED™ shall mean the Leadership in Energy and Environmental Design. This is a trade marked green building rating system created by the U.S. Green Building Council to rate construction projects.

"Light-duty vehicles" shall mean light duty trucks or light duty vehicles, as such terms are defined under section 216(7) of the Clean Air Act (42 U.S.C. §7550(7), having a gross vehicle weight rating (GVWR) of 8,500 lbs. or less, prior to any aftermarket conversion.

"Medium-duty vehicles" shall mean vehicles having a gross vehicle weight rating

(GVWR) of 8,500 to 14,000 lbs.

"Model year" shall mean the time period from September 1 of the previous calendar year through August 31.

"New" shall mean a light duty vehicle not previously under the control of the fuel provider, no matter when the vehicle was manufactured. This includes new leases of vehicles previously leased by other non-state entities.

"New York State Clean Fueled Vehicles Council" shall mean the working group of New York State agency, authority and State university representatives convened in 1998 to guide the progress of the State's efforts to incorporate clean fueled vehicles into its daily operations. The Commissioner the New York State Office of General Services chairs the Council.

"Specialty vehicles" shall mean certain vehicles that are not suitable for general transportation purposes and are not licensed for highway use; for example, light duty construction vehicles, such as backhoes or front-end loaders; and light-duty material handling equipment, such as forklifts.

"Vehicle acquisition" shall mean procurement of a vehicle by purchasing or leasing, or otherwise gaining possession or control of a vehicle.

APPENDIX E

Annual Energy Report

The following Annual Energy Report and all attachments and footnotes must be submitted by December 1st of each year to:

NYSERDA
Attn: Executive Order No. 111 Administrator
17 Columbia Circle
Albany, NY 12203

Executive Order #111
2002 Annual Energy Report

Reporting Period ____/_____/_____ to ____/_____/_____

Agency: _____
Contact: _____
Title: _____
Address: _____
_____
City: _____
State: _____ Zip: _____
Phone: _____ Fax: _____
Email: _____

Energy Usage:

Natural Gas:_____ MMBtu
Fuel Oil: _____ MMBtu
Electricity: _____ MWh
_____ MMBtu Site
_____ MMBtu Source
Coal: _____ MMBtu
Steam: _____ MMBtu
Other _____ MMBtu
Total: _____ MMBtu

Base Year Information:

Previously Reported Base Year Energy Use Index (EUI):

_____ _____
(Source- Btu/SF) *(Site Btu/SF - Optional)*

Adjusted Base Year Energy Use Index (EUI) Btu/SF:

_____ _____
(Source) *(Site Btu/SF - Optional)*

If Adjusted Base Year is used, please include justification.

Metrics:

Agency Size: _____ SF
Number of Bldgs: _____
2002 EUI: _____ Btu/SF
EUI Increase/Decrease Over Base Year: _____%
EUI Increase/Decrease Over Adj. Base Year:_____%

Electrical Demand Information:

Current Summer Peak Demand: ____/____MW
(NYC/Upstate)
Target Summer Peak Demand 2005: ____/____MW
Target Summer Peak Demand 2010: ____/____MW

Procurement of Clean Vehicles*

# of new light duty vehicles acquired this year that are alternate-fueled: _____

% of new light duty vehicles acquired this year that are alternate-fueled: _____%

Attach a description of strategies undertaken to reduce petroleum consumption and emissions for your medium- and heavy-duty vehicle fleet.

Renewable Power:*

Current year's annual electric requirements provided by renewable power:
Generated On-Site _____ kWh
Purchased _____ kWh

% of current year's electric requirements provided by eligible renewable power:_____ %

Target Purchase of Eligible Renewable power:
By 2005 (10%) _____ kWh
By 2010 (20%) _____ kWh

Green Buildings:

Attach a description of strategies undertaken to meet Executive Order No. 111 requirements for new building construction.

ENERGY STAR® Buildings:

Number of buildings meeting EPA ENERGY STAR® building criteria:: _____

Individual Agency Metrics:

To be completed by individual agencies. This section is optional.

*** Requirements take effect in 2005. However, State Entities are encouraged to begin reporting earlier.*

Submitted by:_____ Title: _____
Please Print

Signature: _____Date: _____

APPENDIX F

Historical Energy Consumption Information

The following four pages of data have been reprinted from the annual report, prepared by the former New York State Energy Office in May 1991, summarizing the energy consumption data of New York State Agencies in response to the previous Executive Order No. 132.

The report is titled :

> New York State Energy Office
> State Facilities Energy Conservation Program
> (Executive Order #132)
> Report on 1990 Energy Plans
> Volume 1 - Summary

Data shown as NA for an agency is generally a result of the agency not reporting energy consumption information that year.

State Facilities Annual Plan Data

(Fiscal Year 1989-1990)

Summary of Space Inventory and Energy Use Index (EUI)

Agency	Facilities (#)	Buildings (#)	Gross Area (SF)	Energy Use Index (BTU/SF)	Notes
APA	3	3	38,500	182,338	EUI based on two reported buildings
A&M	1	12	284,489	282,211	
DOCS	61	2,501	27,911,275	264,967	
DEC	290	NA	NA	NA	
DOH	6	99	2,948,270	446,118	
DMNA	72	72	5,125,364	111,682	Gross area estimated by SEO staff
DOS	1	1	135,644	7,970	
DPS	9	17	435,500	178,870	
DOT	490	1,230	6,250,000	NA	
DFY	68	218	1,900,199	193,198	
OGS	23	54	15,556,242	385,277	
OMH	32	1,336	38,135,513	295,097	
OMRDD	18	356	11,000,000	331,759	
OPRHP	NA	1,846	4,200,000	NA	No. of bldgs and gross areas estimated by SEO
SED	3	NA	NA	NA	No. of bldgs estimated by SEO
SIF	7	7	NA	NA	
SUNY	34	2,378	70,550,690	287,206	
Totals	**1,118**	**10,130**	**184,471,686**		

Source: New York State Energy Office, State Facilities Conservation Program, Report on 1990 Energy Plans, Volume 1 Summary, Appendix D

State Facilities Annual Plan Data

(Fiscal Year 1989-1990)

Energy Consumption in MMBTUs

Agency	Electricity Source (MMBTU)	Nat. Gas (MMBTU)	Htg. Oil (MMBTU)	Coal (MMBTU)	Steam)MMBTU)	Other (MMBTU)	Total Energy Cons. (MMBTU)	Percent of State-wide Energy Cons. (%)
SUNY	11,813,597	3,449,399	3,172,335	399,938	1,317,178	110,156	20,262,603	39.52%
OMH	3,001,265	4,214,583	2,606,987	1,430,831	0	0	11,253,666	21.95%
DOCS	2,583,960	1,362,092	3,069,461	282,804	72,983	24,277	7,395,578	14.42%
OGS	3,568,031	930,892	41,209	0	65,649	1,387,685	5,993,467	11.69%
OMRDD	1,386,343	1,014,547	1,190,418	58,041	0	0	3,649,348	7.12%
DOH	655,283	196,509	463,452	0	0	33	1,315,277	2.57%
DMNA	218,088	170,067	168,708	0	15,547	0	572,410	1.12%
DFY	185,709	61,589	119,817	0	0	0	367,114	0.72%
DEC	115,315	8,000	45,573	0	0	779	169,667	0.33%
SIF	89,317	3,388	2,081	0	24,439	0	119,225	0.23%
A&M	62,091	18,194	0	0	0	0	80,285	0.16%
DSP	49,634	11,281	16,983	0	0	0	77,898	0.15%
DOS	4,653	8,636	0	0	0	0	13,289	0.03%
APA	4,002	0	1,923	0	0	0	5,926	0.01%
OPRHP	0	0	0	0	0	0	0	0.00%
SEC	0	0	0	0	0	0	0	0.00%
DOT	0	0	0	0	0	0	0	0.00%
Totals	**23,737,288**	**11,449,177**	**10,898,947**	**2,171,614**	**1,495,796**	**1,552,930**	**51,275,753**	**100.00%**
Percent	**46.29%**	**22.33%**	**21.26%**	**4.24%**	**2.92%**	**2.97%**		

Source: New York State Energy Office, State Facilities Energy Conservation Program, Report on Energy Plans, Volume 1 Summary, Revised 5/29/91

State Facilities Annual Plan Data

(Fiscal Year 1989-1990)

Energy Cost

Agency	Electricity ($)	Nat. Gas ($)	Htg. Oil ($)	Coal ($)	Steam ($)	Other ($)	Total Energy Cons. ($)	Percent of Statewide Energy Cons. (%)
SUNY	68,494,974	13,897,759	11,021,712	825,851	8,065,641	911,173	103,217,110	43.46%
OMH	18,248,250	15,372,096	9,288,225	3,484,702	0	0	46,393,273	19.53%
DOCS	14,808,856	4,913,520	10,784,095	573,686	177,870	83,188	31,341,215	13.20%
OGS	20,496,058	3,694,609	130,444	0	489,762	1,582,377	26,393,250	11.11%
OMRDD	7,801,761	3,726,030	3,974,603	138,086	0	0	15,640,480	6.59%
DOH	3,508,050	620,803	1,500,606	0	0	346	5,629,805	2.37%
DMNA	1,632,158	931,457	925,489	0	91,955	0	3,581,059	1.51%
DFY	1,176,890	349,873	661,808	0	0	0	2,188,571	0.92%
DEC	806,065	47,319	251,756	0	0	10,183	1,115,323	0.47%
SIF	620,618	19,966	11,250	0	168,206	0	820,040	0.35%
A&M	439,319	98,054	0	0	0	0	537,373	0.23%
DSP	364,184	72,899	99,215	0	0	0	536,298	0.23%
DOS	31,215	40,588	0	0	0	0	71,803	0.03%
APA	28,669	0	10,669	0	0	0	39,338	0.02%
OPRHP	0	0	0	0	0	0	0	0.00%
SED	0	0	0	0	0	0	0	0.00%
DOT	0	0	0	0	0	0	0	0.00%
Totals	**138,457,067**	**43,784,973**	**38,659,872**	**5,022,325**	**8,993,434**	**2,587,267**	**237,504,938**	**100.00%**
Percent	**58.30%**	**18.44%**	**16.28%**	**2.11%**	**3.79%**	**1.09%**		

Source: New York State Energy Office, State Facilities Conservation Program, Report on 1990 Energy Plans, Volume 1 Summary, Revised 5/29/91

State Facilities Annual Plan Data

(Fiscal Year 1989-1990)

Annual Consumption in Units of Fuel

Agency	Electricity (kWh)	Nat. Gas (CCF)	Nat. Gas (Therms)	#2 Oil (Gals)	#4 Oil (Gals)	#6 Oil (Gals)	Bituminous Coal (Tons)	Anthracite Coal (Tons)	LP Gas (Gals)	Kerosene (Gals)	Steam (1000 lbs)	Refuse (FDF) (Tons)	Other
SUNY	1,018,413,500	0	34,493,986	2,008,100	1,661,500	17,765,800	16,324	0	298,343	0	947,610	0	6,806
OGS	307,588,900	0	9,309,921	38,400	0	239,700	0	0	0	0	47,230	106,745	0
OMH	258,729,722	40,918,280	0	2,527,774	0	15,072,713	42,505	15,333	0	0	0	0	0
DOCS	222,755,160	13,224,198	0	4,191,570	1,278,440	15,416,370	11,543	0	52,422	0	52,506	0	2,409
OMRDD	119,512,300	9,849,971	0	970,000	0	7,053,300	2,369	0	0	0	0	0	0
DOH	56,489,953	1,907,855	0	165,304	0	2,942,711	0	0	350	0	0	0	0
DMNA	18,800,694	1,651,138	0	1,216,355	0	0	0	0	0	0	11,185	0	0
DFY	16,009,362	0	615,885	863,856	0	0	0	0	0	0	0	0	0
DEC	9,940,916	77,666	0	328,570	0	0	0	0	8,164	0	0	0	0
SIF	7,699,705	7,408	26,254	15,001	0	0	0	0	0	0	17,582	0	0
A&M	5,352,681	0	181,940	0	0	0	0	0	0	0	0	0	0
DSP	4,278,811	109,527	0	122,443	0	0	0	0	0	0	0	0	0
DOS	401,160	83,840	0	0	0	0	0	0	0	0	0	0	0
APA	345,030	0	0	13,868	0	0	0	0	0	0	0	0	0
DOT	0	0	0	0	0	0	0	0	0	0	0	0	0
OPRHP	0	0	0	0	0	0	0	0	0	0	0	0	0
SED	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	**2,046,317,894**	**67,829,883**	**44,627,986**	**12,461,241**	**2,939,940**	**58,490,594**	**72,741**	**15,333**	**359,279**	**0**	**1,076,113**	**106,745**	**9,215**

* - Chilled Water in 1000 Ton Hours

** - Wood in Tons

Source: New York State Energy Office, State Facilities Conservation Program, Report on 1990 Energy Plans, Volume 1 Summary, Revised 5/30/91

APPENDIX G

Conversion Factors

Natural Gas ..... 1 Therm = 100,000 Btu
..... 1 Cubic Foot = 1,028 Btu
..... 1000 Cubic Feet = 1,028,000 Btu

Manufactured Gas ..... 1 Therm = 100,000 Btu
..... 1 Cubic Foot = 650 Btu
..... 1000 Cubic Feet = 650,000 Btu

#2 Fuel Oil ..... 1 Gallon = 140,000 Btu

#6 Fuel Oil ..... 1 Gallon = 152,000 Btu

Butane ..... 1 Gallon = 92,000 Btu

Propane ..... 1 Gallon = 91,333 Btu

Electricity (Site) ..... 1 Kilowatt Hour (kWh) = 3,412 Btu

Electricity (Source) ..... 1 Kilowatt Hour (kWh) = 10,000 Btu

To order additional copies of this report, contact
National Technical Information Service (NTIS):
(800) 553-6847; (703) 487-4650 outside the U.S.
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Albany, New York 12203-6399

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fax: (518) 862-1091

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www.nyserda.org

Executive Order No. 111
"Green and Clean"
State Buildings and Vehicles Guidelines

State of New York
George E. Pataki, Governor

New York State Energy Research and Development Authority
Vincent A. DeIorio, Esq., Chairman
William M. Flynn, President

NYSERDA

Green-e Standard: New York

Green-e Renewable Energy Certification Program

1. Renewable Energy Content

Retail electricity offerings or "electricity products" that serve 100% of a customer's load must contain at least 50% renewable energy based on the product supply mix. Electricity products sold as block products must contain a minimum of 150 kWh/month of new renewable resources.

II. Qualifying Sources of Renewable Electricity Generation

1. **Geothermal**

2. **Wind**

3. **Low-impact Hydro:** Includes hydropower facilities whose output is equal to or less than 30 megawatts, or facilities relicenced by FERC after 1986, or facilities certified by the Low Impact Hydropower Institute (LIHI). The Green-e Program and its stakeholders support LIHI certification and its goals. When the green power market reaches sufficient maturity our intent is to adopt LIHI certification as the sole standard. This decision shall be reviewed annually.

4. **Solar Electric**

5. **Biomass:** Qualifying biomass sources include solid, liquid, or gas fuels derived from these Qualifying Biomass Resources:

   A) All woody biomass excluding:
   - wood that has been coated with paints, plastics, or formica;
   - wood that has been treated for preservation with materials containing halogens, chlorine or halide compounds like CCA-treated materials, or arsenic. (CCA = chromated copper arsenate)

   There may be deminimus quantities of qualified wood fuel (<1% of total wood fuel) that can contain the above excluded contaminates.;
   B) All agricultural crops or waste;
   C) All animal and other organic waste;
   D) All energy crops; and
   E) Landfill gas.

Municipal solid waste is excluded from the list of qualifying biomass resources.

Biomass Emissions Criteria: Any biomass resources used to satisfy the minimum renewable portion of a Green-e product must meet the following emissions criteria. All emissions criteria are based on a weighted average of the emissions from the resource supply mix.

Landfill gas

The NOx emissions of landfill gas facilities that contribute power toward a specific Green-e product shall not exceed 3.5 lb./MWH on an annual basis, based on a weighted average of the resource supply mix. Landfills not otherwise required to flare are exempted from the Landfill gas NOx emissions cap. *Standard(s) for subsequent years will be reviewed based on the evolution of state-of-the art control technologies two years before they are to go into effect and adjusted down if appropriate.*

All Other Qualifying Biomass Resources (as defined above)

The average, weighted NOx emissions of all facilities using qualifying biomass other than landfill gas that contribute power toward a specific Green-e product shall not exceed:

(i) 2.9 lb./MWH of NOx emissions in 2002, 2003, 2004, 2005.

Standard(s) for subsequent years are adopted here, but will be reviewed based on the evolution of state-of-the art control technologies two years before they are to go into effect and adjusted if appropriate.

(ii) 2.63 lb./MWH in 2006, 2007, 2008.

(iii) 2.25 lb./MWH in 2009, 2010, 2011.

Emissions rates from landfill gas may not be factored into the weighted average used in calculating emissions rates from qualifying biomass facilities.

6. **Co-fired Fuels:**

Landfill gas co fired with natural gas

Landfill gas may be co fired with natural gas in a gas unit (including units permitted to burn oil no more than 60 days out of the year), whether piped directly to the gas unit or co-mingled with natural gas before reaching the unit. In either case, the landfill gas must be separately metered and must conform to the emissions limits for landfill gas facilities set above.

Co-firing qualifying biomass resources with fossil fuels

Qualifying biomass resources can be co fired with fossil fuels under the following specific conditions:

A) The proportion of biomass to other fossil fuels is accounted for on an annual basis;

B) Contracts are in place to allow CRS to verify that the biomass was converted into electricity;

C) Only the amount of energy generated from the biomass may be counted as renewable energy;

D) Title to the ~~all~~ non-energy attributes resulting ~~o~~from ~~f~~ the biomass ~~portion of the~~ generation remain entirely (or at least proportionately) with the biomass electricity or Tradable Renewable Certificates (TRCs) marketed as renewable as consist~~a~~ent with NYPSC rules~~; and~~

E) At least 10% of the biomass used is from energy crops~~:~~. and

F) The host plant ~~fossil~~ generating plant is in compliance with all air permits.

7. **Ocean based Resources**: Green-e will consider adopting ocean-based resources and will review these technologies as they mature and as practical application reaches near term.

8. **Fuel cells powered by renewable resources:** Fuel cells powered by any of the above eligible renewable resources are eligible.

III. New Renewable Resource Content

Effective January 1, 200~~3~~23, all Green-e products sold in New York must contain at least 10~~5~~% new renewable resources. The percentage is based on the total product content. This will increase to 15~~0~~% in ~~the~~ 2004. Requirements for 2005 and subsequent years shall be determined at least two years before an increase is made. ~~, 15% in 2005, 20% in 2006, and 25% in 2007.~~ This is consistent with Green-e's national minimum standards. ~~T~~These incremental increases above 25% will be reviewed for approval by the Green-e governing Board on the recommendation of the New York Regional Advisory Committee. CRS reserves the right to modify the new renewable requirement start date on a state-by-state basis to increase consistency within a region.

The threshold date for new renewable facilities in New York is January 1, ~~NY TBD~~1998. Green-e's national definition of new renewables adapted to New York's new renewable threshold date is below.

An eligible new renewable generation facility must either be: (1) placed in operation (generating electricity) on or after January 1, ~~NY TBD~~1998; (2) repowered on or after January 1, ~~NY TBD~~1998 such that at 80% of the fair market value of the project derives from new generation equipment installed as part of the repowering; (3) a separable improvement to or enhancement of an existing operating facility that was first placed in operation prior to January 1, ~~NY TBD~~1998, such that the proposed incremental generation is contractually available for sale and metered separate from the existing generation at the facility; or (4) a separately metered landfill gas resource that was not being used to generate electricity prior to January ~~1,~~1, ~~NY TBD~~1998. Any enhancement of fuel source that

increases generation at an existing facility, without the construction of a new or repowered, separately metered generating unit, is not eligible to participate, with the exception of new landfill gas resources identified in (4) above. An eligible "new renewable" must qualify as an "eligible renewable resource" as described in the Green-e Code-of-Conduct and the New York Standard. Hydropower facilities may not contribute toward achievement of the new renewable requirement at this time.

IV. Emissions Criteria for the Non-Renewable Portion of a Green-e Product

Any non-renewable portion of a Green-e product sold in New York must meet or have lower emissions rates per megawatt hour for SO2, NO2, and CO2 than average emissions rates for the New York system power as of the 20012 ~~2~~ rates reported in NY disclosure statements. The date will be reviewed every two years for possible adjustment. These reported rates were ___ lbs./MWH for SO2, __ _lbs./MWH for NOx, and __ lbs./MWH for CO2. [need to fill in]

V. Power Content for Non-Renewable Portion of a Green-e Product

The product may not include any specific purchases of nuclear power in the non-renewable portion of the product other than what is contained in any system power purchased for the product.

VI. Interaction with Renewable Portfolio Standards

Green-e allows a percentage of a product's renewables content to be satisfied by renewable portfolio standard (RPS) state-mandated renewables up to the percentage RPS requirement as it is applied to a retail product. For example, if the RPS is set at 5% (either company based or product based), only 5% of the Green-e product can be satisfied with renewable power purchased to meet a mandated RPS requirement. Any remaining renewable power needed to fulfill Green-e requirements or product claims can not be satisfied with renewables used to meet any RPS requirement. The Green-e new renewable requirement must be met entirely by renewable generation over and above anything required by state or federal RPS requirements.

VII. Products that Constitute a Portion of a Retail Offering

Green-e will certify blocks of renewable power. Blocks must contain a minimum amount of 150 kWh per month of 100% new renewable resources on an annual basis. Blocks containing more than 150 kWh per month may include existing renewables for any amount above 150 kWh per month.

The block products must be part of an all-requirements electricity offering. Any non-renewable portion of the electricity offering must meet the same

emissions requirements and power content requirements as with all other Green-e blended products (see IV, V above).

Green-e Standard: New York

Green-e Renewable Energy Certification Program

Approved by the Green Power Board on September 10, 2002

1. Renewable Energy Content

Retail electricity offerings or "electricity products" that serve 100% of a customer's load must contain at least 50% renewable energy based on the product supply mix. Electricity products sold as block products must contain a minimum of 150 kWh/month of new renewable resources.

II. Qualifying Sources of Renewable Electricity Generation

1. **Geothermal**

2. **Wind**

3. **Hydro:** Includes hydropower facilities whose output is equal to or less than 30 megawatts, or facilities relicenced by FERC after 1986, or facilities certified by the Low Impact Hydropower Institute (LIHI). The Green-e Program and its stakeholders support LIHI certification and its goals. When the green power market reaches sufficient maturity our intent is to adopt LIHI certification as the sole standard. This decision shall be reviewed annually.

4. **Solar Electric**

5. **Biomass:** Qualifying biomass sources include solid, liquid, or gas fuels derived from these Qualifying Biomass Resources:

   A) All woody biomass excluding:
   - wood that has been coated with paints, plastics, or formica;
   - wood that has been treated for preservation with materials containing halogens, chlorine or halide compounds like CCA-treated materials, or arsenic. (CCA = chromated copper arsenate)

   There may be deminimus quantities of qualified wood fuel (<1% of total wood fuel) that can contain the above excluded contaminates;
   B) All agricultural crops or waste;
   C) All animal and other organic waste;
   D) All energy crops; and
   E) Landfill gas.

Municipal solid waste is excluded from the list of qualifying biomass resources.

Biomass Emissions Criteria: Any biomass resources used to satisfy the minimum renewable portion of a Green-e product must meet the following emissions criteria. All emissions criteria are based on a weighted average of the emissions from the resource supply mix.

Landfill gas

The NOx emissions of landfill gas facilities that contribute power toward a specific Green-e product shall not exceed 3.5 lb./MWH on an annual basis, based on a weighted average of the resource supply mix. Landfills not otherwise required to flare are exempted from the Landfill gas NOx emissions cap. *Standard(s) for subsequent years will be reviewed based on the evolution of state-of-the art control technologies two years before they are to go into effect and adjusted down if appropriate.*

All Other Qualifying Biomass Resources (as defined above)

The average, weighted NOx emissions of all facilities using qualifying biomass other than landfill gas that contribute power toward a specific Green-e product shall not exceed:

(i) 2.9 lb./MWH of NOx emissions in 2002, 2003, 2004, 2005.

Standard(s) for subsequent years are adopted here, but will be reviewed based on the evolution of state-of-the art control technologies two years before they are to go into effect and adjusted if appropriate.

(ii) 2.63 lb./MWH in 2006, 2007, 2008.

(iii) 2.25 lb./MWH in 2009, 2010, 2011.

Emissions rates from landfill gas may not be factored into the weighted average used in calculating emissions rates from qualifying biomass facilities.

6. **Co-fired Fuels:**

   Landfill gas co fired with natural gas

   Landfill gas may be co fired with natural gas in a gas unit (including units permitted to burn oil no more than 60 days out of the year), whether piped directly to the gas unit or co-mingled with natural gas before reaching the unit. In either case, the landfill gas must be separately metered and must conform to the emissions limits for landfill gas facilities set above.

7. **Ocean based Resources**: Green-e will consider adopting ocean-based resources and will review these technologies as they mature and as practical application reaches near term.

8. **Fuel cells powered by renewable resources:** Fuel cells powered by any of the above eligible renewable resources are eligible.

III. New Renewable Resource Content

Effective January 1, 2002, all Green-e products sold in New York must contain at least 10% new renewable resources. The percentage is based on the total product content. This will increase to 15% in 2004. Requirements for 2005 and subsequent years shall be determined at least two years before an increase is made. This is consistent with Green-e's national minimum standards. Incremental increases above 25% will be reviewed for approval by the Green-e governing Board on the recommendation of the New York Regional Advisory Committee. CRS reserves the right to modify the new renewable requirement start date on a state-by-state basis to increase consistency within a region.

The threshold date for new renewable facilities in New York is January 1, 1998. Green-e's national definition of new renewables adapted to New York's new renewable threshold date is below.

An eligible new renewable generation facility must either be: (1) placed in operation (generating electricity) on or after January 1, 1998; (2) repowered on or after January 1, 1998 such that at 80% of the fair market value of the project derives from new generation equipment installed as part of the repowering; (3) a separable improvement to or enhancement of an existing operating facility that was first placed in operation prior to January 1, 1998, such that the proposed incremental generation is contractually available for sale and metered separate from the existing generation at the facility; or (4) a separately metered landfill gas resource that was not being used to generate electricity prior to January 1,1998. Any enhancement of fuel source that increases generation at an existing facility, without the construction of a new or repowered, separately metered generating unit, is not eligible to participate, with the exception of new landfill gas resources identified in (4) above. An eligible "new renewable" must qualify as an "eligible renewable resource" as described in the Green-e Code-of-Conduct and the New York Standard. Hydropower facilities may not contribute toward achievement of the new renewable requirement at this time.

IV. Emissions Criteria for the Non-Renewable Portion of a Green-e Product

Any non-renewable portion of a Green-e product sold in New York must meet or have lower emissions rates per megawatt hour for SO2, NO2, and CO2 than average emissions rates for the New York system power as of the June 2001rates reported in NY disclosure statements. The date will be reviewed every two years for possible adjustment. These reported rates were ___ lbs./MWH for SO2, __ _lbs./MWH for NOx, and __ lbs./MWH for CO2. [These need to be located.]

V. Power Content for Non-Renewable Portion of a Green-e Product

The product may not include any specific purchases of nuclear power in the non-renewable portion of the product other than what is contained in any system power purchased for the product.

VI. Interaction with Renewable Portfolio Standards

Green-e allows a percentage of a product's renewables content to be satisfied by renewable portfolio standard (RPS) state-mandated renewables up to the percentage RPS requirement as it is applied to a retail product. For example, if the RPS is set at 5% (either company based or product based), only 5% of the Green-e product can be satisfied with renewable power purchased to meet a mandated RPS requirement. Any remaining renewable power needed to fulfill Green-e requirements or product claims can not be satisfied with renewables used to meet any RPS requirement. The Green-e new renewable requirement must be met entirely by renewable generation over and above anything required by state or federal RPS requirements.

VII. Products that Constitute a Portion of a Retail Offering

Green-e will certify blocks of renewable power. Blocks must contain a minimum amount of 150 kWh per month of 100% new renewable resources on an annual basis. Blocks containing more than 150 kWh per month may include existing renewables for any amount above 150 kWh per month.

The block products must be part of an all-requirements electricity offering. Any non-renewable portion of the electricity offering must meet the same emissions requirements and power content requirements as with all other Green-e blended products (see IV, V above).

APPENDIX C Meeting Minutes from 2002 Green-e Sessions

Documents included:

Green-e Northeast Biomass Subcommittee NYSERDA Offices (June 13, 2002)
Green-e New York Advisory Committee Meeting Agenda (July 18, 2002)
Green-e New York Advisory Committee Meeting Draft Minutes (July 18, 2002)
Green Power Board Meeting Conference Call Minutes (September 10, 2002)

Green-E Northeast Biomass Subcommittee
NYSERDA Offices, Albany, NY - June 13, 2002
Draft Meeting Summary

In attendance:
Gabe Petlin, Center for Resource Solutions, Green-e Program Manager
Jeff Peterson, NYSERDA
Judy Jarnefeld, NYSERDA
John Irving, Burlington Electric
Stacie Edick, CNY Resource Conservation & Development Project, Inc.
Tim Volk, SUNY Environmental Science & Forestry
Chris Lindsey, Antares Group, Inc.
Robert Grace, Sustainable Energy Advantage, LLC
Chris Sinton, Alfred University
William Carlson, USA Biomass Power Producers Alliance
Rick Handley, Northeast Regional Biomass Program
Cliff Chen, Natural Resources Defense Council
Sam Swanson, Pace Energy - Power Scorecard Project
Derek Grasso, Integrated Waste Services Assoc.

Presenters:
Lori Bird, National Renewable Energy Laboratory
Janet Cushman, Oak Ridge National Laboratory

By Phone:
Ed Gray, Antares Group Inc.
Deborah Donovan, Union of Concerned Scientists
Meredith Wingate, Center for Resource Solutions
Dan Lieberman, Center for Resource Solutions
Carrie Harvilla, Center for Resource Solutions

By Video:
Kate Iovanna, Landfill Methane Outreach Program, US EPA

Gabe Petlin opened the meeting with introductions. He then reviewed the purpose of the meeting, and ground rules. He reviewed the Green-e objectives:

- Expand the market for renewable energy.
- Create a level playing field for renewable resources without favoring one resource over another.
- Bolster consumer confidence in reliability of renewable energy products.

He also presented some core principles of Green-e:

- Green-e does not favor one renewable technology over another. We work to create a level playing field for all allowed renewable technologies and we believe the marketers themselves can determine what the market place prefers, as this is a voluntary process.
- Green-e is a floor not a ceiling for renewable energy product standards.
- We will try to work towards consensus.

- The Green Power Board will act on your recommendations and make the final decision.
- Understanding scope is critical: non-energy policy issues and sitting policy issues are beyond the scope of Green-e.

Then we did a brief **walk around the table**, each member mentioned what they thought needed to be changed or clarified in the current New England Green-E standard to make it work for New York and the Northeast as a whole. We tried not to engage in discussion at this point. This list represents the issues individuals wish to see addressed. Not all issues were addressed in the meeting due to lack of consensus.

Items mentioned include: (* indicate people reiterating that point)

- Add "energy crops" to definition of biomass. ***
- Consider adding "co-firing biomass with coal" ****
- "Pressurized" should be changed to "pressure treated"
- "does not contain" should be changed to "contains minimal amounts"
- Consider if even having NOx standards is appropriate, or should we just improve definition of biomass?
- There IS a place for emissions standards
- Continue to include existing plants, not only new plants
- MSW has a place, excluding it and including landfill gas is not internally consistent.
- Forest residues should be included
- How inclusive is wood waste?
- Keep benchmarks for performance *
- Aim for a common standard with New York and New England
- More specific is better
- Performance standard that reflects a reduction in NOx emissions rather than just a flat cap. (at each facility)
- Can we say a percentage of the power should be locally produced, within the region?
- Concerns about complexity of NOx emissions standards
- Concerns about consistency across regions
- Should be consistent with environmental disclosure rules.
- In terms of Tradable Renewable Certificates (TRCs), aka "Green tags", only applies to TRCs generated within the region.

Next, Janet Cushman, Oak Ridge National Laboratory and Lori Bird, National Renewable Energy Laboratory gave **presentations** (see power point presentations also attached) Janet spoke about Biomass Feedstocks and Lori discussed Life Cycle Analysis and Conversion Technologies.

Next, we discussed the **Objective Criteria** for Basing Green-E decisions on which biomass resources to include in the standard.
These criteria are proposed by Green-e as a starting point:

1) Net environmental benefit
2) Emissions profile consistent with state law
3) Verifiable by Green-E
4) Adequate supply of affordable renewables
5) Ideally we are working towards a Northeast-wide standard

Discussion of the criteria:

- Does net environmental benefit (NEB) include only life cycle analysis, emissions, energy efficiency etc - or does it also include impact on water, soil, habitat etc?
- Does NEB include diverting biomass from higher value use as negative and from more damaging use as positive?
- Does NEB look at reducing emissions or only at emissions thresholds?
- #2 might be redundant - if they don't meet state law they won't be operating -
- #2 - do we want to go beyond state law? Should we say "must be in compliance with permit"
- #3 - should be transparent - this info should be readily available through the facilities permit and annual audits.
- #4 - might this be a chicken and egg thing? With the Green-E premium do certain biomass supplies become more valuable and therefore "affordable" at a higher price, i.e. - without the Green-E premium, might some biomass be too expensive?
- Performance based Nox emission standards is a good way to go.
- Standards should allow for improvement over time
- Percent of biomass generation should be "in region" - this might be redundant with Environmental disclosure statement.

In sum, other suggestions were made and the group decided to move on to direct discussion of the standard.

Recommendation for a Green-E Northeast Biomass Standard

[See attached draft biomass standard to follow the discussion below.]

The rationale for each recommendation is briefly discussed.

<u>Qualifying Biomass Resources</u>

The subcommittee took an inclusive approach and emphasized that all resources in each category are included unless expressly excluded. The only excluded biomass feedstocks are: municipal solid waste, and wood with certain contaminants (see draft standard for definition of contaminated wood.) While some see the net environmental benefits of MSW, others are concerned about toxic emissions. This list of feedstocks is consistent with the New England Green-e standard, but the language is more precise and explicit to avoid potential “gray areas.” One difference is the allowance of “deminimus” quantities of contaminated wood (defined as less than 1% of total wood fuel.) This is a practical consideration of reality of waste wood.

Co-firing landfill gas with natural gas

The language is the same as the New England Standard. There was little discussion.

Co-firing of qualifying biomass resources with other fossil fuels is permitted under specific conditions

Data on emissions reductions from co-firing biomass with coal were presented. New York State is moving forward with energy crop programs intended for co-firing with coal. Many see energy crops as a benefit for rural economic development and co-firing as an effective emission reduction tool. NY has a dedicated collecting station for energy crops which some pointed to as evidence of lasting economic development benefits of energy crops. The specific conditions proposed are designed to address concerns of critics. The requirement that 10% of the biomass be from energy crops is designed to bolster the argument that co-firing will have rural economic development benefits.

Green-e and Green Power Board (which governs the Green-e standard) hold the view that biomass co-firing with coal and other fossil fuels has demonstrated environmental benefits which are sufficient justification for allowing it in a Green-e product. The real problem unfortunately is the negative public perception of co-firing. For this reason the Board adopted a national policy for Green-e that only co-firing of land fill gas with natural gas is allowed. Until the perception changes the Board felt the risks to the Green-e Program (in terms of negative criticism) out way the positive environmental benefits of co-firing.

That said, Gabe Petlin advised the group to expect some resistance and to weigh carefully how much time to invest in pushing this issue. At the same time at least one other Green-e stakeholder group in Iowa has proposed allowing co-firing. Green-e staff agreed that the time may have come for a revisiting of the issue. Key is the need to have a consensus of the stakeholder group in order to move forward.

Emissions Performance Criteria for Landfill Gas

The New England language was adopted, with minor edits for clarity.

Emissions Performance Criteria for All Other Qualifying Biomass Resources

The same Nox emissions performance criteria and time table as New England were adopted. There is one pending issue. Two biomass plants in New York are being checked to find their current NOx emissions rate. The intent is to not exclude these plants. If their emissions are above the cap the proposal will be to have the same performance criteria, but on a later time table. New England would be asked to synchronize with this timetable.

Identify next steps and unresolved issues:

- Specific assignments were made to participants to bring back data needed for completion of the recommended standard.
- We set July 18 as the date of the NY Advisory Committee to review the recommendation and other issues for creating the NY standard.
- It was suggested that the recommendation be presented to the New England Advisory Committee at a later date.

Green-e Renewable Energy Certification Program

Agenda
Green-e New York Advisory Committee Meeting
July 18, 9:30 AM – 4:00 PM
NYSERDA Board Room, NYSERDA
17 Columbia Circle, Albany, NY
NYSERDA Tel: (518) 862-1090
Center for Resource Solutions (CRS)
Contact: gpetlin@resource-solutios.org, (415) 561-2100
Conference Call in Number: 734-414-0267 - participant code: 214949

Purpose of Meeting:

- *Provide brief overview of Green-e Program and updates on new nationwide Green-e Tradable Renewable Certificate (TRC) Standard*
- *Hear brief update on status of New York State Green Power Market*
- *Hear recommendations of Northeast Biomass and Hydro Subcommittee for NY Green-e Standard*
- *Discuss and agree on complete recommendation for NY Green-e Standard*
- *Discuss whether NY Advisory Committee and New England Advisory Committee should be merged*
- *Identify Issues for future meetings*

CRS Facilitator:	Gabe Petlin, Green-e Program Manager
Host:	NYSERDA

9:00 – 9:30 **Continental Breakfast**

9:30 – 9:40 **Welcome, Introductions, and Review Purpose of Meeting**, Gabe Petlin

9:40 – 9:50 **Review Green-e Program Objectives**, Gabe Petlin

- Expand the market for renewable energy
- Create a level playing field for renewable energy without favoring one resource over another
- Bolster consumer confidence in reliability of renewable energy products
- Set a floor, not a ceiling, for renewable energy products

9:50 – 10:10 **Overview Status of Green Power Market in New York,** Bob Grace, *not confirmed*

- Brief overview of green power market in NY: supply, resources, offerings, rules, and other key issues
- Additional updates, comments, and questions from participants

10:10 – 10:30 **Update on Green-e National Standard for Tradable Renewable Certificates (TRCs) and its Relationship with Regional Electricity Standards**, Gabe Petlin

- Review new nationwide Green-e TRC standard
- Regional Green-e definitions of Qualifying Sources of Renewable Electricity Generation affect TRCs sold from NY generation in NY and elsewhere.

10:30 – 10:45 **Renewable Energy Content***

* Indicates criteria that are part of the Green-e National Standard

Green-e Renewable Energy Certification Program

10:45 – 10:55	**BREAK**
10:55 – 11:15	**Qualifying Sources of Renewable Generation – PART I** • Geothermal • Wind • Small Hydro/Low Impact Hydro (discussion later in meeting) • Solar Electric • Biomass (MSW, fuel types, emissions) (discussion later in meeting) • Co fired Fuels (discussion later in meeting) • Ocean Based Resources • Fuel Cells Powered by Renewable Fuels
11:15 – 12:15	**Qualifying Sources of Renewable Generation – PART II** • Recommendation of Northeast Biomass Subcommittee on Biomass: MSW, fuel types, emissions, and co-fired fuels, Biomass Subcommittee Co-Chairs
12:15 – 12:45	**LUNCH BREAK**
12:45 – 1:15	**Wrap-up Biomass Discussion**
1:15 – 2:00	**Qualifying Sources of Renewable Generation – PART III** • Recommendation of Northeast Hydropower Subcommittee on Small and Low-impact Hydropower, Tom Rawls, Green Mountain Energy
2:00 – 2:10	**BREAK**
2:10 – 2:50	**New Renewable Resource Content and Start Date*** • Set new renewables start date • Set new renewables requirement glide path schedule
2:50 – 3:00	**Emissions Criteria for Non-Renewable Portion of a Green-e Product***
3:00 - 3:15	**Power Content for Non-Renewable Portion of a Green-e Product*** • Define system power
3:15 – 3:25	**Interaction with Renewable Portfolio Standards***
3:25– 3:40	**Products Which Constitute a Portion of a Retail Offering*** • Different Standard for C&I Customers?
3:40 – 3:50	**Should New York and New England Advisory Committees be Merged?**
3:50 – 4:00	**Next Steps, Who is Responsible for What?**
4:00	**ADJOURN**

Updated July 15, 2002

* Indicates criteria that are part of the Green-e National Standard

Green-e Renewable Energy Certification Program

Green-e Principles:

- Green-e does not favor one renewable technology over another. We work to create a level playing field for all allowed renewable technologies and we believe the marketers themselves can determine what the market place prefers, as this is a voluntary process.
- Green-e is a floor not a ceiling for renewable energy product standards.
- We will try to work towards consensus.
- Green Power Board will act on your recommendations and make the final decision.
- Understanding scope is critical: non-energy policy issues and sitting policy issues are beyond the scope of Green-e.

Green-e New York Advisory Committee Meeting Draft Minutes
July 18, 2002
NYSERDA Offices, Albany, NY
Center for Resource Solutions

Present:
Cliff Chen - NRDC
Peter Blom - ConEdison Solutions
John Irving - Burlington Electric
Christine Vanderlan - Environmental Advocates of NY
Rick Handley - Northeast Regional Biomass Program
Ira S. Rubenstein - Environmental Business Association of New York State, Inc.
Tom Thompson - 1st Rochdale Cooperative Group
Ed Gray - Antares Group Inc.
Sam Swanson - Renewable Energy Tech. Analysis Project, Pace Energy Project
Thomas H. Rawls, Green Mountain Energy Company
Bob Grace, Sustainable Energy Advantage, LLC
John B. Wynsma, Ontario Power Generation - Evergreen Energy Division
Matt Foley, Riverat Gas and Electric, NY
Jeff Peterson - NYSERDA
Judy Jarnefeld - NYSERDA
Gabe Petlin - Center for Resource Solutions
Stacie Edick - CNY Resource Conservation & Development
John Stouffer - Sierra Club
Brent Beerly - Community Energy

BY PHONE
Chris Sinton - Alfred University
William Carlson - USA Biomass Power Producers Alliance
Carrie Harvilla - Center for Resource Solutions
Jane Hotchkiss Gordy - Consultant
Kirk Brown - Center for Resource Solutions
Deborah Donovan - Union of Concerned Scientists
Ann Marie McShea - Center for Resource Solutions

WELCOME, INTRODUCTIONS, REVIEW PURPOSE OF MEETING AND AGENDA
The meeting was called to order at 9:40.
We made introductions around the table and on the phone. Reviewed agenda and purpose of meeting:

- *Provide brief overview of Green-e Program and updates on new nationwide Green-e Tradable Renewable Certificate (TRC) Standard*
- *Hear brief update on status of New York State Green Power Market*
- *Hear recommendations of Northeast Biomass and Hydro Subcommittee for NY Green-e Standard*
- *Discuss and agree on complete recommendation for NY Green-e Standard*
- *Discuss whether NY Advisory Committee and New England Advisory Committee should be merged*
- *Identify Issues for future meetings*

REVIEW GREEN-E PROGRAM OBJECTIVES

Gabe reviewed Green-e history and goals and objectives including:

- Expand the market for renewable energy
- Create a level playing field for renewable energy without favoring one resource over another
- Bolster consumer confidence in reliability of renewable energy products
- Set a floor, not a ceiling, for renewable energy products

Once there is a standard in place Green-e activities in the region will shift to assisting in marketing and promoting Green Power products certified by Green-e. Example educational collateral materials were passed around. Questions were answered on the Green-e Program. Participants seeking additional information on Green-e can view the website at: www.green-e.org.

OVERVIEW STATUS OF GREEN POWER MARKET IN NEW YORK [Slides and Paper Attached]

Bob Grace gave a brief overview of the status of the green power market in NY.

- Madison wind project is the only current retail offering in NY via PGENEG's Purewind Certificates.
- Niagara Mohawk is planning to offer green power via several renewable energy service providers in the Fall.
- NY PSC Environmental Disclosure law requires a conversion transaction for green power sales. This makes it difficult for unbundled retail transactions of "green tags."
- NYSERDA has grants out and more available soon to develop green energy products.
- There will not likely be a need to import green power from outside of NY.
- PACE's Larry Dewitt is at the ISO trying to address the issue of intermittence and unbundling.
- Current renewable capacity in NY:
  - 48 MW of wind power
  - 30 MW of woody biomass
  - 30 MW of landfill gas
  - 218 hydroelectric facilities totaling approximately 650 MW or approximately 20% of the state supply

UPDATE ON GREEN-E NATIONAL STANDARD FOR TRADABLE RENEWABLE CERTIFICATES (TRCs) AND ITS RELATIONSHIP WITH REGIONAL ELECTRICITY STANDARDS (Slides attached)

Gabe gave an update on Green-e's standard for Tradable Renewable Certificates (TRC's) and the relationship to regional standards. This information can easily be viewed on the Green-e website at: www.green-e.org.

- Green-e has both bundled electricity and unbundled TRC-only products certified. Currently 6 TRC products are certified by Green-e.
- Customers purchasing a bundled product receive their electricity and green attributes from the same provider.
- Customers purchasing TRCs receive attributes from one provider and continue to receive electric service from their conventional supplier.
- Sales of bundled products are greater, because Green-e released the TRC standard in March 2002. There have been significant sales of TRCs in 2002 and the market is growing.
- In the Mid-Atlantic the majority of green power sales in 2002 have been from TRCs including wind and some new landfill gas.

Gabe reviewed the governance structure and process of Green-e:

- Green-e's standards are 1st developed as recommendations from Regional Advisory Committees, such as NY and then presented to the national Green Power Board for review and approval. The Green Power Board is made up of representatives from energy, environment, and consumer advocates. Utility regulators and power marketers participate as non-voting members.
- CRS and the Green Power Board must balance the need for maintaining credibility of the Green-e standard and not prohibiting growth of the market.

Gabe next discussed the relationship between Green-e's TRC and electricity standard:

- The TRC standard is national. The one area that is affected by regional standards in resource definitions. If a state or region excludes a resource from the eligible resource definition it precludes that type of generation only in that region from being marketed in TRC products. It does not affect the rest of the country.
- TRC's from outside of NY can be marketed in NY.
- TRC products are 100% new renewables. Electricity products are at least 50% renewable and each region has different percentages of new renewables required which increase over time.

Lastly, Gabe discussed use of the Green-e logo by commercial customers

- The EPA Green Power Partnership (GPP) program has adopted the Green-e standard for resource definitions.
- Green-e's minimum purchase requirements for display of the Green-e logo has been synchronized with EPA's GPP recognition standard. These threshold commitment levels are now:
  - > 100,000,000 kWh per year 2% of commercial load
  - < 100,000,000 kWh per year 3% of commercial load
  - < 10,000,000 kWh per year 6% of commercial load
  - < 1,000,000 kWh per year 10% of commercial load
  - < 100,000 kWh per year 15% of commercial load

RENEWABLE ENERGY CONTENT

Gabe prefaced the standard setting portion of the meeting by explaining that some of the criteria are part of Green-e's national standard and the Green Power Board is unlikely to consider changes that depart from these minimum criteria. Other portions of the standard are designed to meet the needs and interests of the regional advisory committees. The following describes the national vs. regional standards:

Green-e National Standard Criteria:

- Minimum 50% renewable blended products **or** 100% new renewable block products of a minimum size of 150 kWh per month
- No differentiated purchases of nuclear power
- Any non-renewable portion of the product has equal or less air emissions for SOx, NOx, and carbon than system power
- Abide by Green-e Code of Conduct requirements
- Required verification of product renewables, marketing claims, compliance with Green-e criteria
- RPS interaction w/ Green-e (in general sense)
- Minimum new renewable requirement
- Minimum environmental and consumer protection disclosure requirement (disclosure is made consistent with state mandated disclosure whenever possible)

Regional Options:

- Increase the percentage of required renewables
- Modify the types of renewable resources included in Green-e products (including option to exclude certain renewables or to allow varying types of cofiring)
- Increase the percentage of new renewables required
- Create emissions requirements or caps for renewable resources e.g. biomass emissions limits in New England
- Define the baseline year for system power emissions.

First we discussed the "non-controversial" resource options, ones that tend to be included in Green-e standards with little or no discussion. A vote was taken and passed unanimously to include: Geothermal, Wind, Solar Electric, renewable powered fuel cells, and ocean based resources. Pace Energy Project requested that all solar electric facilities count as new. This proposal was tabled for lack of time. The other resources are discussed next.

SMALL AND LOW IMPACT HYDRO

The Northeast Hydro Subcommittee met three times by conference call this spring (see list of subcommittee participants). Their recommended standard is

"Low-impact hydropower includes hydropower facilities whose output is equal to or less than 30 megawatts, or facilities relicensed by FERC after 1986, or facilities certified by the Low Impact Hydropower Institute (LIHI). The Green-e Program and it's stakeholders support LIHI certification and it's goals. When the green power market reaches sufficient maturity our intent is to adapt LIHI certification as the sole standard. This decision shall be reviewed annually."

Tom Rawls and Sam Swanson, members of the subcommittee, explained the issues and deliberations of the subcommittee in reaching this recommendation.

- <30 megawatts is not necessarily low impact, some larger facilities have less impact.
- 30 megawatts is an arbitrary number, but smaller facilities can not afford to re-license with FERC if their current license is adequate.
- LIHI certification is expensive, facilities won't apply unless it is required by Green-e.
- LIHI has yet to certify a facility in New York. A 500 kW facility is certified in CT, and another in Oregon.
- Green-e should not require LIHI certification exclusively until LIHI certification has become more present. This is to avoid market power issues and to avoid excessive constraint of the nascent green power market.
- Because each of the three criteria have their own limitations, the subcommittee decided that facilities should be able to qualify under any one of the three until LIHI is in a better position to certify facilities.
- LIHI looks at water flow, fish movement, erosion, recreation, water quality and endangered species impacts.
- There could be potential conflict with NAFTA if Canadian facilities are not certifiable. They don't have FERC, and vast majority are > 30 megawatts. John Wynsama of OPG spoke about Canada's Eco-Logo. They originally had a 20 MW cap, but discarded that. They do consider efficiency improvements at existing facilities. Incremental increases in output count as new. They have 29 Eco-Logo certified facilities under 30 megawatts totaling 140 megawatts.

NY Advisory Committee voted to accept the hydro standard as presented by the Hydro Subcommittee. Two members abstained for want of additional information: Christine Vanderlan of Environmental Advocates of NY, and John Stouffer of Sierra Club.

BIOMASS (see biomass overview slides, and co-firing slides)

The Northeast Biomass Hydro Subcommittee met via a conference call and held a one day meeting on June 13 at Albany (see attached meeting summary and participant list.) Their recommended standard is included in the attached **Draft NY Green-e Standard**. First John Irving, one of the Co-Chairs of the subcommittee, presented the recommendations and rationale for the qualifying fuel types and emission standards.

Qualifying Biomass Resources

The subcommittee took an inclusive approach and emphasized that all resources in each category are included unless expressly excluded. The only excluded biomass feedstocks are: municipal solid waste (MSW), and wood with certain contaminants (see draft standard for definition of contaminated wood.) While some see the net environmental benefits of MSW, others are concerned about toxic emissions. This list of feedstocks is consistent with the New England Green-e standard, but the language is more precise and explicit to avoid potential "gray areas." One difference is the allowance of "deminimus" quantities of contaminated wood (defined as less than 1% of total wood fuel.) This is a practical consideration of reality of waste wood.

Discussion

There was some discussion to try to understand the definition of contaminated wood. The bulk of the discussion was around the sustainability of the forest products and byproducts contained in the draft standard. NRDC prefers to exclude mill residues, but all other participants objected to their exclusion. Sierra Club prefers that only wood from sustainably managed forests certified by Forest Stewardship Council (FSC) be allowed into Green-e products. The McNeil Station in Burlington, VT has 4 foresters that go out and certify what they purchase. Some small woodlot owners might have sustainably managed wood lots, but can't afford FSC or other certification. There was no specific assertion made that demand for woody biomass is contributing to unsustainable forest management in NY. This is a discussion about the *potential* for a future problem. The NY Advisory Committee did not have enough information to determine if this would be a good choice at this time. They agreed to ask the Biomass Subcommittee to reconvene to evaluate whether the Green-e standard should require certified forest products. The subcommittee will meet in the Fall and develop a recommendation. The group voted to add the following language, but subsequent to the meeting the Green-e program decided not to add intent language to the standard until the outcome of the subcommittee process. "Green-e supports sustainable forestry as represented by the Forest Stewardship Council and will develop a suggested criteria for evaluation of forest biomass by January, 2003."

Combustion of MSW is excluded from the draft NY standard. One member requested that the Advisory Committee consider in the future gasification of municipal solid waste. Since this is not direct combustion of MSW, most believe it is already allowed. When a specific operating example is commercially available Green-e can determine if it is already allowed.

Emissions Performance Criteria for Landfill Gas

For landfill gas the same Nox emissions cap as New England (3.5 lbs/MWh) was recommended by the Subcommittee.

Discussion

There was some discussion of tightening the cap, but not enough information was presented in the meeting to make a decision. The cap was accepted unanimously and following language was added:

"*Standard(s) for subsequent years will be reviewed based on the evolution of state-of-the art control technologies two years before they are to go into effect and adjusted down if appropriate.*"

Emissions Performance Criteria for other Qualifying Biomass Resources

The same Nox emissions performance criteria and time table as New England were adopted unanimously with little discussion. The time table will start at year 1 in 2002. (see draft NY Standard.)

Co-firing Landfill Gas with Natural Gas

The language is the same as the New England Standard and was accepted unanimously. There was little discussion.

Co-firing of Qualifying Biomass Resources with Other Fossil Fuels

Ed Gray, a Co-Chair of the subcommittee, presented the recommendation of the subcommittee to allow co-firing of qualifying biomass resources with other fossil fuels under specified conditions (see draft NY standard.) Ed presented slides with data on emissions reductions from co-firing biomass with coal and describing aspects of the technology and energy crops being developed in NY. New York State is moving forward with energy crop programs intended for co-firing with coal. Many see energy crops as a benefit for rural economic development and co-firing as an effective emission reduction tool. NY has a dedicated collecting station for energy crops which some pointed to as evidence of lasting economic development benefits of energy crops. The specific conditions proposed are designed to address concerns of critics. The requirement that 10% of the biomass be from energy crops is designed to bolster the argument that co-firing will have rural economic development benefits.

Discussion

There was overall support for allowing co-firing of qualified biomass resources with fossil fuels and some concerns raised that participants felt could be addressed. One is the issue of public perception around a coal plant that is not in compliance with air permit regulations. It was decided that to eligible for a Green-e product co-fired biomass would have to come from host facilities that are in compliance with all air permits. (see draft NY standard.)

Another concern raised is the fear of a coal plant that has frequently been in the news for emissions issues using the Green-e label. Gabe explained that the facility does not get to use the Green-e label - only the marketer of the mix that includes the portion of co-fired biomass. Green-e is quite vigilant about abuse and unauthorized use of the Green-logo and enforces its trade mark protection rigorously.

Finally the issue of allocation of the emissions benefits resulting from biomass co-firing was discussed. The intent of the recommendation was to insure that all of the attributes resulting from biomass co-firing be assigned to the biomass electricity or Tradable Renewable Certificates (TRC's) marketed as renewable. 10% biomass co-firing is likely to reduce NOx emissions by 15% or more. Participants recognized that the allocation of the attributes depends

on the rules adopted by the NYPSC. Therefore the Advisory Committee adopted the following language modification:

"Title to the non-energy attributes resulting from the biomass generation remain entirely (or at least proportionately) with the biomass electricity or Tradable Renewable Certificates (TRCs) marketed as renewable as consistent with NYPSC rules."

NEW RENEWABLE RESOURCE CONTENT

Currently NY has: 48 megawatts wind, 30 megawatts woody biomass, 30 megawatts landfill gas. All of this capacity came on line since 1997. Bob Grace presented one analysis of future new capacity that projected about 360 megawatts of additional renewables coming online by 2010. This includes renewables developed to meet demand for green power market products meeting Green-e standards, NY State green power procurement goals, the RPS in NJ, and export of some NY power to New England. NYSERDA expects an additional 400 megawatts of wind by 2003.

Discussion

The NYAC discussed adopting 1997 vs. 1998 for the New Date.
1998 - CON's: One landfill gas facility that came online in 1997 would not count as new.
1998 - PRO's: We would be in concert with New England standard. NY generators want to market to New England. Landfill gas is already economical, and the 1997 LFG facility can qualify for Green-e as an existing facility.

The NYAC adopted January 1, 1998 unanimously as the new date for New York.

Minimum New Renewables % Glidepath

New England's current minimum new is 10%. 2003 and out years have not been set. NY has market constraints rather than supply constraints. Participants wanted to be consistent with New England to begin with and then go as high as is feasible for the NY market.

The question was called on the following New York schedule:
2002 - 10%; 2003 - 10%; 2004 - 15%; 2005 and out years are to be set by the end of 2003 and will not be less then 15%.

This passed with one abstention from Brent Beerly of Community Energy, who believes NY's new renewables requirement should be higher from the start and ramp up faster.

EMISSIONS CRITERIA FOR THE NON-RENEWABLE PORTION OF A GREEN-E PRODUCT

Any non-renewable portion of a Green-e product sold in New York must meet or have lower emissions rates per megawatt hour for SO2, NO2, and CO2 than average emissions rates for the New York system power as of the 2001rates reported in NY PSC disclosure statements. The date will be reviewed every two years for possible adjustment.

Passed unanimously.

POWER CONTENT FOR NON-RENEWABLE PORTION OF A GREEN-E PRODUCT

The product may not include any specific purchases of nuclear power in the non-renewable portion of the product other than what is contained in any system power purchased for the product.

Passed unanimously.

INTERACTION WITH RENEWABLE PORTFOLIO STANDARDS

Green-e allows a percentage of a product's renewables content to be satisfied by renewable portfolio standard (RPS) state-mandated renewables up to the percentage RPS requirement as it is applied to a retail product. For example, if the RPS is set at 5% (either company based or product based), only 5% of the Green-e product can be satisfied with renewable power purchased to meet a mandated RPS requirement. Any remaining renewable power needed to fulfill Green-e requirements or product claims can not be satisfied with renewables used to meet any RPS requirement. The Green-e new renewable requirement must be met entirely by renewable generation over and above anything required by state or federal RPS requirements.

NY currently does not have an RPS. Passed unanimously.

PRODUCTS THAT CONSTITUTE A PORTION OF A RETAIL OFFERING

Green-e will certify blocks of renewable power. Blocks must contain a minimum amount of 150 kWh per month of 100% new renewable resources on an annual basis. Blocks containing more than 150 kWh per month may include existing renewables for any amount above 150 kWh per month.

The block products must be part of an all-requirements electricity offering. Any non-renewable portion of the electricity offering must meet the same emissions requirements and power content requirements as with all other Green-e blended products.

Passed unanimously.

Meeting adjourned at 4:38 PM.

Green Power Board Meeting Conference Call
September 10, 2002
Center for Resource Solutions

Present:
Green Power Board
Karl Rábago, Green Power Board Chair and Cargill Dow
Jan Smutney-Jones, Independent Energy Producers Association
Alan Nogee, Union of Concerned Scientists
Dan Kirshner, Environmental Defense
Jan Hamrin, Center for Resource Solutions
Liz Robinson, Energy Coordinating Agency
Bill Spratley, Green Energy Ohio
Brent Beerley, Community Energy (non-voting PMAC representative)

CRS Staff
Anne Marie, Kirk Brown, Gabe Petlin, Matthew Lehman

Stakeholder Representatives
Jeff Peterson, NYSERDA

Note: all votes were unanimous unless noted otherwise.

Purpose of the call
The goal of the call was to review the draft New York Green-e standard proposed by the New York Advisory Committee (NYAC). The board also reviewed the Texas Advisory Committee's recommendations regarding TRC block size and renewable off-set technologies.

The Board welcomed Brent Beerley, Community Energy, to his first Green Power Board meeting in his capacity as the non-voting representative of the Power Marketer's Advisory Committee and Jeff Peterson, NYSERDA, who was representing the NYAC.

I. Review of the NYAC Proposed Green-e standard

Background: The NYAC met in Albany, NY on July 18th. The proposed criteria developed by the group is largely consistent with Green-e national criteria. Areas with differences included: hydro and biomass definitions, biomass co-firing, and new renewables schedule.

I.A Hydropower definition - The NYAC proposed the same criteria as the New England stakeholder group and added goal language on using only LIHI certified facilities once the green power market matures. While certain groups in the NYAC supported a more restrictive hydropower definition, the annual review of the hydropower criteria called for in the proposal will provide such groups the opportunity of monitoring the market's progress.

Decision: The Board adopted the NYAC recommendation on hydropower definition.

I.B. Biomass definition - The NYAC proposed criteria are based on recommendations from a June 13th Northeast Biomass Subcommittee meeting. The definition emphasizes that unless a resource is expressly excluded, the biomass definition is inclusive across the biomass resource categories. The list of feedstocks is consistent with the New England Green-e standard; however the language is more precise to reflect practical considerations related to certain waste streams. The NYAC also recommended the following intent language related to FSC certification: "Green-e supports sustainable forestry as represented by the Forest Stewardship Council and will develop a suggested criteria for evaluation of forest biomass by January, 2003."

The Board also reviewed the additional proposed exclusions to the NYAC standard that had not ultimately been adopted by the Stakeholder group, including:

a. mill residues;
b. an energy crop, agricultural crop, crop byproduct or residue resource produced on Conservation Reserve Program lands if such harvest would be inconsistent with the environmental purposes of the conservation program;
c. recyclable post consumer waste paper;
d. animal waste that comes from animal feeding operations with more than 1,000 animal units.
e. forest residues from forests not certified by the Forest Stewardship Council (FSC).
f. forest residues other then slash, brush, harvesting residue, and precommercial thinnings.

Given its similarities, the Board asked how well the biomass definition has worked in New England. Despite the small size of the market, the New England definition has worked well to date. The Board expressed concern about the intent language on FSC certification given advice from experts on FSC certification that the proper disposition of wood product-related wastes is an issue regardless of a whether a forest is certified by FSC.

Decision: The Board adopted the NYAC recommendation on biomass definition, minus the proposed FSC intent language. One vote was recorded against dropping the FSC intent language.

I.C. New Renewables – The NYAC proposed a minimum percentage new requirement schedule that begins with a 10% requirement for 2002-2003, moves to 15% by 2004, and proposed January 1, 1998 as the baseline definition of new. The proposed criteria are consistent with Green-e national criteria.

Decision: The Board adopted the NYAC recommendation on new renewables resource content and start date.

I.D. Co-firing – The NYAC criteria include language on allowing biomass co-firing of landfill methane gas with natural gas. This criteria is consistent with national Green-e criteria. The language also included a recommendation that biomass co-firing with fossil fuels be included in the final definition, which is a departure from current Green-e national policy governing biomass.

Jeff Peterson from NYSERDA presented the NYAC proposed criteria that includes biomass co-firing with fossil fuels. He provided background on co-firing and its relationship to encouraging the development of energy crops in NY State. The state's recent Executive Order on renewable energy purchasing does not include biomass co-firing with fossil fuels in its renewables definition. However, several large energy users in NY are interested in purchasing energy from biomass co-firing with fossil fuels.

The Board discussed the NYAC proposed criteria in light of the Board-approved national Green-e policy adopted in 1999 that excluded biomass co-firing with fossil fuels from Green-e criteria. The Board concluded that the fundamental drivers behind that decision, including customer perception and verification issues, still remain to be settled in the market.

Decision: The Board adopted the NYAC recommendation on biomass co-firing of landfill methane gas with natural gas, but tabled the NYAC recommendation on biomass co-firing with fossil fuels until additional information has been gathered, including:

1) Verification and potential customer perception issues related to fossil-fuel biomass co-firing to be addressed by the NYPSC or other regulatory body;
2) A pilot of fossil-fuel biomass co-firing conducted in NY documents progress in addressing these issues, particularly related to verification and customer perception; and
3) Green power marketers interested in seeking Green-e certification for offerings including fossil-fuel biomass co-firing request Board review of the issue via the Green-e Power Marketers Advisory Committee.

Further, the Board will explore the issue of biomass co-firing with fossil fuels on a comprehensive, national basis and encourages Green-e staff to identify program partners (i.e., NYSERDA and others) that could participate in and help support that work.

II. Review of the Texas Advisory Committee Recommendations for Modifications to Approved Texas Green-e Standard and National TRC Standard

Background: The Texas Advisory Committee met on April 25, 2002 in Austin Texas and proposed the following recommendations.

II.A. Relationship of TRC block size to minimum resource content of Texas Green-e electricity product – The Texas Advisory Committee proposed that the minimum block size for TRC products increase from 150 kWh per month to 600 kWh per month. This would approximate the minimum new renewable resource content of a Green-e certified electricity product in Texas. Other options for addressing the situation include maintaining the current TRC minimum block size and monitoring for potential negative impacts of TRC products on Green-e certified electricity sales.

During discussion, the Board affirmed that the Green-e TRC standard is intended to serve as a single, national standard.

Decision: The Board supported not increasing the TRC block size but instead instructed staff to monitor with stakeholders the Texas market for potential, demonstrable negative impacts of TRC products on Green-e certified electricity sales.

II.B. Eligibility of renewable off-set technologies for TX Green-e Standard - The Texas Advisory Committee proposes that renewable off-set technologies issued RECs by ERCOT be added to the list of eligible Green-e resources in Texas (excluding natural gas). ERCOT is developing methodologies for issuing RECs for geothermal heat pumps and solar hot water heaters. Staff recommended that the Green Power Board might better address this issue at such time that:

1) rules and estimation methodologies are developed by the TXPUC and ERCOT to govern these technologies; and
2) green power marketers express an interest in marketing solar hot water heater and geothermal heat pump off-set RECs in Green-e products in Texas.

Decision: The Board supported the staff recommendation.

III. Changing Board membership

Blake Early, American Lung Association (consumer interest) and John White, Center for Energy Efficiency and Renewable Technologies (energy non-marketer) are potentially leaving the Green Power Board. The Southwest, Northwest and Texas are regions currently not represented. Individuals with similar sector interests would be the preferred replacements. A PUC Commissioner *Ex-Officio* position is also unfilled. Board members were asked to present Jan Hamrin with ideas for potential new board members.

Chair: Motion to adjourn. Seconded.

APPENDIX D Presentations from the July 18, 2002 Green-e Session

Slides included:

Cofiring Biomass with Fossil Fuels: Where Pollution Control and Green Power Converge. Edward Gray, Antares Group Inc.

Overview Status of Green Power Market in New York. Robert Grace, Sustainable Energy Advantage, LLC.

Cofiring Biomass with Fossil Fuels

Where Pollution Control and Green Power Converge

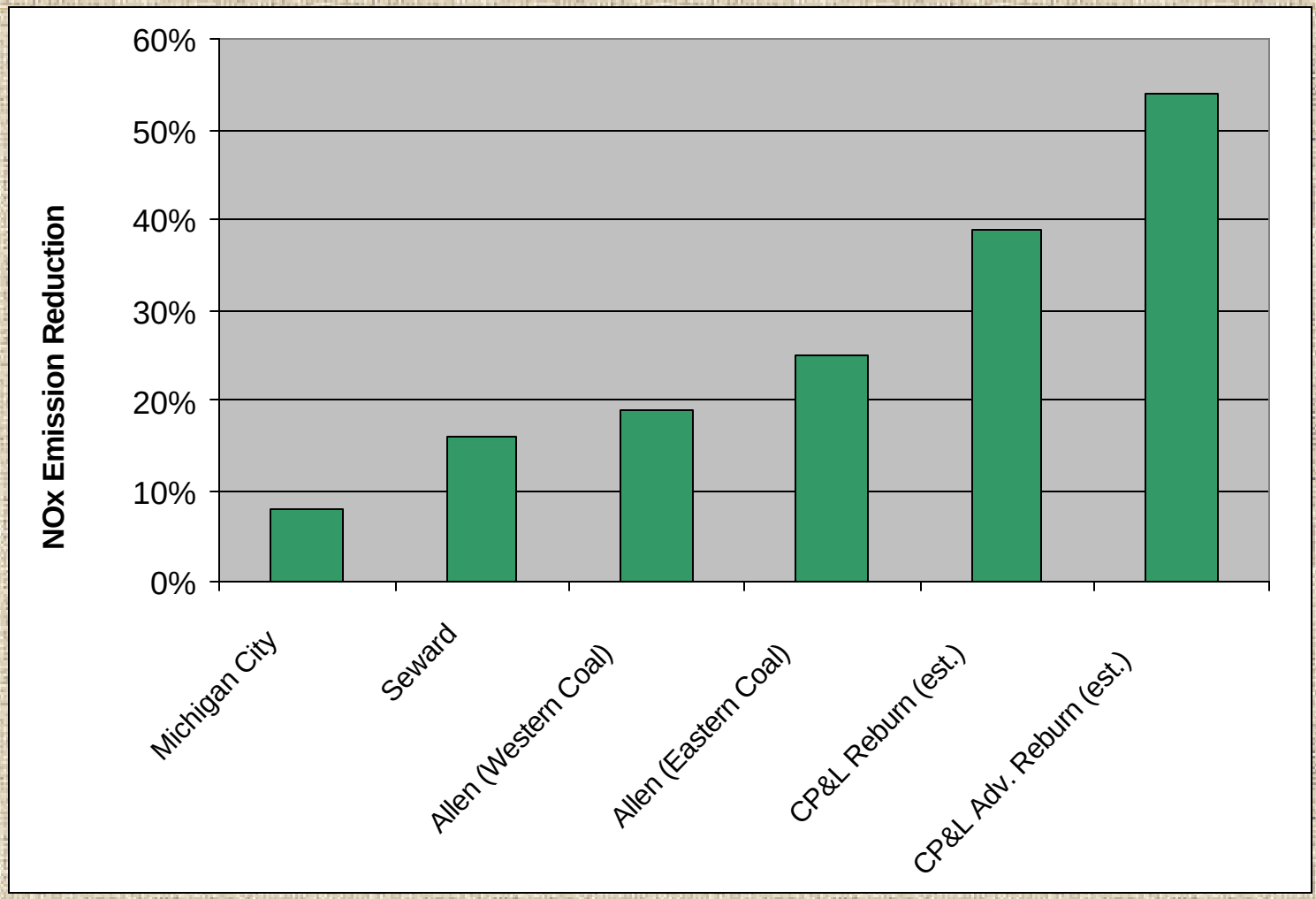
July 18, 2002

NY Green-e Advisory Committee

Biomass Cofiring for Pollution Control

- Directly substituting biomass for coal has immediate environmental benefits
  - One for one SO_x reductions
  - Reduced NO_x emissions
  - Reductions in other trace elements found in coals (e.g. mercury)
  - Reduced ash byproducts
  - Near one for one greenhouse gas reductions on lifecycle basis

Range of NO_x Benefits



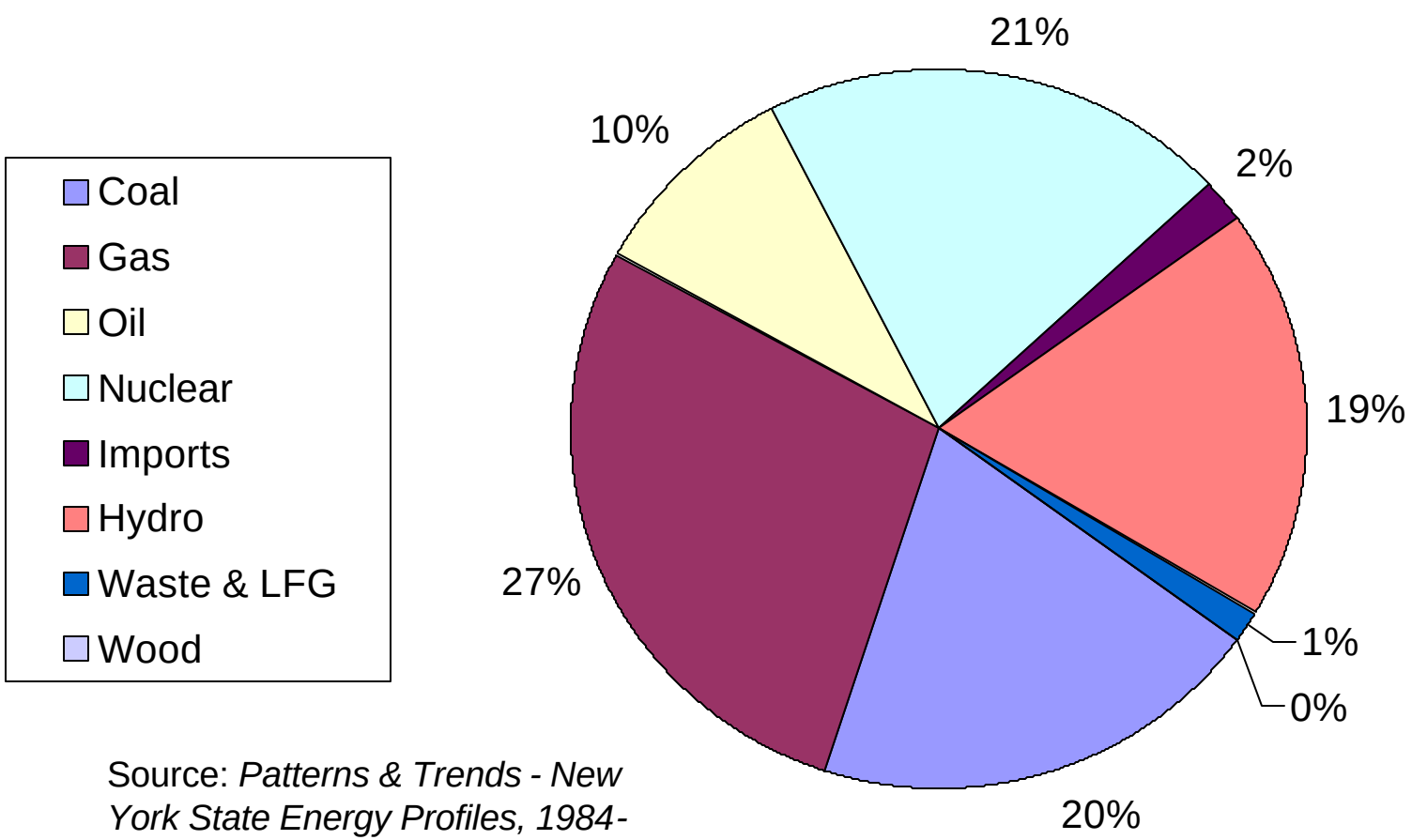
Biomass Cofiring as Green Power

- More green electrons per pound of biomass (higher conversion efficiency)
- Bridge for introduction of sustainably grown energy crops (10%)
- Reduced capital investment ($300/kW) results in lower green power premiums

Willow Watts from Cofiring

- Maintaining green space
- Introducing new habitat
- Soil conservation
- Rural economic benefits

New York - 1998 Energy by Fuel Type



Source: *Patterns & Trends - New York State Energy Profiles, 1984-1988, NYSERDA, Energy Analysis Program*

NY Renewable Generation Facilities

(from RePIS Database, early 2000 data misses 3 wind projects totaling 48 MW)

Facilities	Bioenergy	Hydro	Photovoltaic	Wind	Total
Number of Operating Facilities by Technology	36	218	37	2	293
Total Installed Capacity (kilowatts) by Technology	470,278.00	5,535,209.00	1,052.90	20	6,006,559.90